PB86-106648

# Draft Environmental Impact Statement for Metropolitan Seattle Wastewater Facilities Plan. Volume 2. Richmond Beach King County, Washington

(U.S.) Environmental Protection Agency
Seattle, WA

Aug 77

U.S. Department of Commerce
National Technical Information Service
NTIS

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See also PB86-106606. Prepared in cooperation with Municipality of Metropolitan Seattle, WA., Washington State Dept. of Ecology, Olympia, and Montgomery (James M.), Inc., Pasadena, CA.

The Draft Environmental Impact Statement is summarized in terms of the proposal, the alternatives considered, the direct and indirect impacts on the environment, and measures to mitigate adverse impacts. The Municipality of Metropolitan Seattle has prepared a Draft Facility Plan for Puget Sound plants to the year 2005. Alternatives in the Draft Facility plan are focused on facilities at West Point, Alki, Carkeek Park, and Richmond Beach. The Draft EIS summarizes the impacts of the alternatives for the Richmond Beach plant and service area.

KEYWORDS: *Sewage treatment, *Environmental impact statements-draft.

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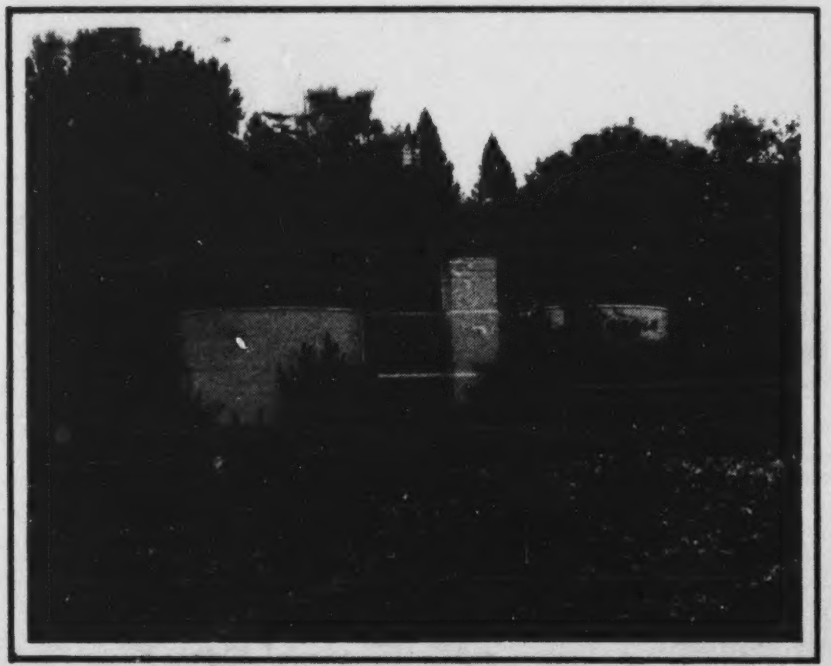

METRO

# Draft Environmental Impact Statement for Metropolitan Seattle Wastewater Facilities Plan

## Volume II Richmond Beach

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Municipality of Metropolitan Seattle

# DRAFT

# ENVIRONMENTAL IMPACT STATEMENT

# FOR

# METROPOLITAN SEATTLE

# WASTEWATER FACILITIES PLAN

## VOLUME II

## RICHMOND BEACH

MUNICIPALITY OF METROPOLITAN SEATTLE

SEATTLE, WASHINGTON

# DRAFT ENVIRONMENTAL IMPACT STATEMENT
# FOR
# METROPOLITAN SEATTLE WASTEWATER FACILITIES PLAN

## Volume II

## Richmond Beach

King County, Washington

Municipality of Metropolitan Seattle
Seattle, Washington

Washington State Department of Ecology
Olympia, Washington

with the assistance of
James M. Montgomery, Consulting Engineers, Inc.
Pasadena, California/Boise, Idaho

# INTRODUCTION

## A. Action Sponsor

The action sponsor is the Municipality of Metropolitan Seattle (METRO) for purposes of compliance with the State Environmental Policy Act (SEPA Chapter 43.21C RCW).

## B. Lead Agency, Responsible Official and Contact Person

For SEPA Compliance

Lead Agency: Municipality of Metropolitan Seattle
600 First Avenue
Seattle, Washington 98104

Responsible Official: Neil Peterson
Executive Director

Contact Person: Peter S. Machno
Manager, Environmental Planning Division

## C. Authors and Contributors to Draft Environmental Impact Statement

Participating Agencies: Department of Ecology
Municipality of Metropolitan Seattle

Advisory Agencies: City of Seattle
King County
Puget Sound Council of Governments

Consultants: James M. Montgomery, Consulting Engineers, Inc. (EIS)
Metropolitan Engineers (Facilities Plan)
Human Resources Planning Institute (Socio-economic studies)

## D. Licenses and Permits Required to Implement Wastewater Facilities Plan

Funding, building, grading, complex source permit, shoreline permit and other local governmental permits would be required before implementing most of the alternatives described herein.

E. Location of EIS Background Data

Municipality of Metropolitan Seattle
Environmental Planning Division
SEPA Information Center, Room 404
600 First Avenue
Seattle, Washington 98104

F. Cost to Public for a Copy of the EIS

No charge while supply lasts.

G. Date of Issue of Draft EIS

This Draft Environmental Impact Statement was made available to the public on September 23, 1977.

H. Final Due Date for Public and Agency Comments

The final date for submittal of public and agency comments is November 11, 1977. All comments should be sent to Dr. Peter S. Machno, Municipality of Metropolitan Seattle.

# TABLE OF CONTENTS

Distribution List

Summary of Draft EIS Contents

Description of the Proposal

Preface

Page

I. CHAPTER I - BACKGROUND 1

Site Constraints and Issues 1

II. CHAPTER II - EXISTING ENVIRONMENTAL CONDITIONS 5

Physical Environment 5
- Topography 5
- Geology and Soils 5
- Seismology 7
- Seismic Hazard 7
- Climate 7
- Air Quality and Odors 8
- Noise 8
- Water Resources 10

Biology 12
- Terrestrial Biology 12
- Puget Sound Ecology 12

Natural Resources and Energy 15

Human Environment 15
- Land Use 15
- Legal and Institutional 16
- Agency and Neighborhood Goals 16
- Economics and Costs 19
- Employment 20
- Social, Recreational and Cultural 20
- Archeological and Historical 20
- Health and Safety 21
- Aesthetics and Nuisance 21

III. CHAPTER III - ALTERNATIVES AND IMPACTS 22

General 23

Development of Alternatives for Richmond
- Beach 24
- Service Area 24

# Table of Contents

Page

- Treatment Processes 24
- Effluent Disposal 25
- Sludge Management 25
- Flow and Waste Reduction Measures 25
- Beneficial Use of Reclaimed Water 27

Regional Alternatives 28
- Alternative A - No Action 28
- Alternative B - Metro Comprehensive Plan (No Action Pursuant to PL 92-500) 28
- Alternative C - Major Combined Sewer Overflow Control 30
- Alternative D - Partial Combined Sewer Overflow Control 30
- Alternative E - Secondary 30
- Alternative F - Secondary/Southern Strategy 30
- Alternative G - Secondary/West Point Phaseout Option 31
- Alternative H - Deconsolidation/ Reclamation 31

Alternative A (No Action) 33
- General Description 33
- Impacts 41
- Mitigation Measures 46
- Unavoidable Adverse Impacts 46

Alternative B (Metro Comprehensive Plan - No Action Pursuant to PL 92-500 47
- General Description 47
- Impacts 48
- Mitigation Measures 53
- Unavoidable Adverse Impacts 54

Alternatives C and D 55
- General Description 55
- Impacts 55
- Mitigation Measures 61
- Unavoidable Adverse Impacts 62

Alternatives E, F, and G 63
- General Description 63
- Impacts 63
- Mitigation Measures 69
- Unavoidable Adverse Impacts 70

Table of Contents

Page

Alternative H 71
- General Description 71
- Impacts 71
- Mitigation Measures 78
- Unavoidable Adverse Impacts 79

SUMMARY OF IMPACTS 81
- Geology, Soils and Topography 81
- Air Quality and Odors 81
- Water Quality 82
- Biology 82
- Natural Resources and Energy 84
- Human Environment 84

IV. CHAPTER IV - CITIZEN AND AGENCY INVOLVEMENT 89

APPENDICES

Appendix A - ELEMENTS OF THE ENVIRONMENT A-1

Appendix B - REFERENCES B-1

LIST OF FIGURES

| Figure | | Page |
|---|---|---|
| 1-1 | Metro Treatment Plant Service Areas | 2 |
| 1-2 | Aerial View of Richmond Beach | 3 |
| 2-1 | Topography | 6 |
| 2-2 | Richmond Beach Intertidal and Subtidal Environment - Sandy Gravel Tideland | 13 |
| 2-3 | Richmond Beach Intertidal and Subtidal Environment - Rock and Cobble Tideland | 14 |
| 2-4 | Zoning - Richmond Beach | 17 |
| 3-1 | Metro 201 Facility Plan Service Area Alternatives | 29 |
| 3-2 | Richmond Beach Service Area Boundaries | 34 |

## Table of Contents

Figure | Page
3-3 Richmond Beach Wastewater Treatment Plant-Primary Treatment (Existing) 39
3-4 Enhanced Primary Treatment 56
3-5 Secondary 64
3-6 Facility Plan Alternative H - Deconsolidation/Reclamation 72

## LIST OF TABLES

Table | Page
2-1 Summary of Pollutant Concentrations 9
3-1 Summary of Alternatives - Richmond Beach 32
3-2 Sludge Truck Traffic at Richmond Beach 88

## DISTRIBUTION LIST

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- Environmental Review Committee
- Department of Community Development
- Office of Policy Planning

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- Seattle - King County Department of Health
- Department of Budget & Program Planning
- Department of Planning & Community Development
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Puget Sound Council of Governments
Snohomish Municipal Metropolitan Corporation-King County (SNOMET)
Puget Sound Air Pollution Control Agency
Chairperson, Citizen's Water Quality Advisory Committee
Chairperson, Metropolitan Sewer Advisory Committee
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City of Edmonds
City of Lynnwood
City of Black Diamond
Metro's component and contracted agencies
National Wildlife Federation
Friends of the Earth
Sierra Club
Audubon Society
Washington Environmental Council
Institute of Environmental Studies (University of Washington)
Ecotope Group

# SUMMARY OF DRAFT EIS CONTENTS

environmental impact statement

The Draft EIS is summarized in terms of the proposal, the alternatives considered, the direct and indirect impacts on the environment, and measures to mitigate adverse impacts.

## The Proposal

The Municipality of Metropolitan Seattle has prepared a Draft Facility Plan for Puget Sound plants to the year 2005. Alternatives in the Draft Facility plan are focused on facilities at West Point, Alki, Carkeek Park, and Richmond Beach, but other sites within these designated service areas have been considered as options. The Metro plant at Renton is not included in the proposed facilities, but effects of alternatives on Renton are described since Renton is an integral part of the Metro system.

This Draft EIS summarizes the impacts of the alternatives for the Richmond Beach plant and service area.

## Regional Alternatives

The eight regional alternatives are summarized below, particularly as they affect Richmond Beach. The Draft EIS analyzes the impacts of the eight regional alternatives proposed in the Draft Facility Plan, as they would be applied to Richmond Beach. Each alternative is evaluated on a coequal basis in the Draft; no recommended alternative has been selected.

Regional alternatives were developed to address, in various combinations, four polar issues: water quality, site impacts, the law (PL 92-500) and costs. Components considered in developing alternatives included service area, collection system and transfer interceptors, treatment process, plant site, treated wastewater discharge location, combined sewer overflow control, and sludge management. Interceptors to serve new growth areas were not included.

Two of the regional alternatives (A and B) are "no action" alternatives required by SEPA and NEPA. Two of the alternatives (C and D) address combined sewer overflows, a local water quality problem. Four alternatives (E, F, G, and H) provide secondary treatment and other variable features.

From the eight regional alternatives, it is possible to derive hybrid alternatives that select components from more than one alternative and blend them into a new alternative, such as secondary treatment plus combined sewer overflow controls.

## Alternative A - No Action

No capital expenditure would be made for expansion, modification or upgrading of treatment plants, or construction of new interceptors during the planning period (until 2005). Alternative A is evaluated to meet SEPA "no action" requirements.

Under Alternative A, Richmond Beach would continue to provide primary treatment, with a capacity in 2005 of 2.5 mgd average, 9 mgd peak. No capital improvements would be made at the plant.

## Alternative B - Metro Comprehensive Plan (No Action Pursuant to PL 92-500)

Plant upgrading and transfer interceptor construction would be done according to the Metro Comprehensive Plan. Alternative B is evaluated as the "no action" alternative pursuant to PL 92-500 and NEPA requirements and serves as the baseline for other regional alternatives. Puget Sound plants (West Point, Alki, Carkeek Park and Richmond Beach) would be retained with primary treatment. Improved sludge management and disinfection practices would be provided in Alternative B and all following alternatives. Four new transfer interceptors and improvements to the Alki outfall would be included.

At Richmond Beach, only miscellaneous improvements would be made. The plant would continue to provide primary treatment for 2.5 mgd average, 9 mgd peak flows.

## Alternative C - Major Combined Sewer Overflow Control

Major portions of combined sewer overflows would be controlled by transfer from fresh to salt water and/or treatment. The existing Puget Sound plants would be upgraded to provide enhanced primary treatment by physical/chemical treatment of solids during the summer. A new wet weather enhanced primary treatment plant would be constructed in the lower Duwamish industrial area and the Alki plant would be abandoned, both in 1995.

Richmond Beach would be upgraded to enhanced primary treatment by addition of chemicals in 1981. This would require construction of chemical storage and feeding equipment. Flows would be 2.5 mgd average, 9 mgd peak. All new equipment would fit on the existing plant property. The outfall to Puget Sound would not be modified.

### Alternative D - Partial Combined Sewer Overflow Control

Wet weather combined sewer overlfows would be reduced to Lake Washington, Lake Union and the West Seattle shoreline. The four Puget Sound plants would be upgraded to enhanced primary treatment with chemical addition during the summer for improved solids removal.

Richmond Beach would be upgraded to an enhanced primary plant by 1981. Wastewater flows would be 2.5 mgd average, 9 mgd peak. Chemical storage and feeding equipment would be constructed at the existing site. The outfall to Puget Sound would not be modified. This regional alternative would be the same as Alternative C at Richmond Beach.

### Alternative E - Secondary

Secondary treatment would be added to the West Point, Alki and Richmond Beach wastewater treatment plants. The Carkeek Park plant would provide primary treatment for wet weather flows only beginning in 1985; dry weather flows would be pumped to West Point.

Secondary treatment would be provided for 2.5 mgd average, 8 mgd peak capacity at Richmond Beach by 1981. The secondary aeration basins and clarifiers would require the use of more land, which is presently available on the Richmond Beach plant property. New sludge digestion facilities would be built to handle the additional solids load.

### Alternative F - Secondary/Southern Strategy

Secondary treatment would be provided at Richmond Beach and West Point (with a reduced service area). A major new secondary treatment facility would be constructed in the Duwamish industrial area in 1985; the Alki plant would be abandoned at that time. A new outfall off Alki Point would be built for discharging effluent from the Duwamish (and Renton) plants. The Carkeek Park plant would provide primary treatment for wet weather flow only beginning in 1985; dry weather flows would be pumped to West Point.

Alternative F would be equivalent to Alternative E at Richmond Beach. Secondary treatment would be provided by 1981.

### Alternative G - Secondary/West Point Phaseout Option

Secondary treatment would be provided at the Alki and Richmond Beach plants. West Point would continue as a primary treatment plant for wet weather flows only, beginning in 1985. A new secondary treatment plant in the Interbay area (Commodore Way or Golf Park sites) would be constructed. The Carkeek Park plant would provide primary treatment for wet weather flows only beginning in 1985; dry weather flow would be pumped to West Point.

Alternative G would be equivalent to Alternative E at Richmond Beach. Secondary treatment would be provided by 1981.

### Alternative H - Deconsolidation/Reclamation

Secondary treatment would be provided at West Point, Alki, Carkeek Park and Richmond Beach. Areas of growth would be served by new inland plants with local effluent and sludge re-use possible. Advanced waste treatment would be provided at new North and South Lake Sammamish plants. A new secondary plant at Kenmore would discharge treated effluent to Puget Sound.

At the Richmond Beach plant, Alternative H would be equivalent to Alternative E wherein secondary treatment would be provided by 1981. Differences in the service area would result from constructing the Kenmore outfall. Ultimately a 21 mgd average, 55 mgd peak secondary treatment plant, the Kenmore plant would provide secondary treatment before transferring wastewater to Puget Sound for discharge through a new outfall at Richmond Beach.

## Environmental Impacts

The primary (direct) and secondary (indirect) impacts of each alternative are described by categories in the physical, biological and human environments plus natural resources and energy. A summary of the major effects of each alternative is described below.

### Alternative A (No Action)

Alternative A, which would continue sewerage service to the present sewered area but provide no capital improvements, would have comparable impacts in 2005 as existing conditions. No impacts on soils or air quality would occur. Near the beach, fecal coliform levels exceeding commercial shellfishing standards would probably continue due to occasional underchlorination of Richmond Beach effluent; however, the exact source of contamination has not yet been determined. On the other hand occasional overchlorination may lead to chlorine residual levels where toxic effects are possible. Offshore, small changes in water quality would continue near the plume. Although no information has been collected on the benthic or nearshore biota, it is possible that subtle shift in species composition and diversity (similar to those measured at Carkeek Park) are occurring at Richmond Beach now and would continue under Alternative A.

At the Richmond Beach site, impacts would continue to be insignificant since the plant is adequately masked from views from nearby residences. Odors are not a problem. Sludge truck traffic of 0.8 trip per day is considered insignificant.

Alternative A would not comply with the secondary treatment requirements of PL 92-500, and the implementation of this alternative is not realistic. It is evaluated merely to show the consequences of no action according to SEPA.

### Alternative B - (Metro Comprehensive Plan No Action Pursuant to PL 92-500)

At Richmond Beach, Alternative B and its impacts would be equivalent to Alternative A except for the insignifcant impacts associated with installing and operating a chlorine leak detector.

Alternative C - (Major Combined Sewer Overflow Control)

Under Alternative C, the provision of enhanced primary treatment at Richmond Beach would not affect soils, topography or air quality. The improved treatment during summer would reduce annual BOD and suspended solids loads to the Puget Sound outfall relative to Alternatives A and B. Nutrient addition (nitrogen) would be approximately at present levels. Heavy metals and some toxicants would be reduced during the summer months. Minor or insignificant changes in water quality or biota (particularly offshore benthic, nearshore and tidal organisms) may occur. The coliform bacteria levels in shellfish areas may decline somewhat, but the fluctuating chlorine residual from under or overchlorination could continue the potential for public health effects or long-term toxic impacts on biota.

At the Richmond Beach site, the impacts would continue to be insignificant since the plant is well screened from residential views, and generates no odor complaints. Sludge truck traffic would increase to 1.3 trips per day, but this is judged to be insignificant. Provision of chemical feeding and storage facilities for enhanced primary treatment would cause temporary, insignificant activities at the site.

Alternative C does not comply with the PL 92-500 requirements for secondary treatment as currently written. Consequences could include fines and ineligibility for grant funding.

Alternative D - (Partial CSO Control)

At Richmond Beach, Alternative D would require the same facilities and cause the same impacts as Alternative C.

Alternative E -(Secondary)

Providing secondary treatment at Richmond Beach would require facilities expansion from 2.4 to 4.2 acres on Metro plant property with no shoreline fill. Although there would be moderate changes in topography and soils conditions during excavation or spoils disposal, these impacts would not be significant.

Water quality in Puget Sound would benefit locally from 75 to 80 percent reductions in BOD and suspended solids plus associated decreases in metals, toxicants and other loadings; no important change in nutrient loads would occur. The nearshore and offshore biota may be expected to benefit from reduced pollutant loads, but existing information is limited, so impacts are not certain. Under chlorination (with possible coliform counts above shellfish standards) or overchlorination (and potential toxicity) would continue with the present type of chlorine application equipment.

The site impacts would be minor due to the fact that the plant is shielded from residential areas. Sludge truck traffic would increase to 1.1 trips per day, but this would not be a significant impact.

This alternative would comply with the secondary treatment requirement of PL 92-500, although there is still some uncertainty regarding timing requirements of the NPDES permit. Providing secondary treatment at Richmond Beach by 1981 is more likely to satisfy NPDES permit requirements than the later dates projected in the Draft Facility Plan for other Puget Sound plants.

### Alternative F - (Secondary/Southern Strategy)

Since the implementation of Alternative F at Richmond Beach would require the same facilities as Alternative E, the impacts would be equivalent.

### Alternative G - (Secondary/West Point Phaseout Option)

Since the implementation of this alternative at Richmond Beach would involve the same facilities and service area as Alternative E, the impacts would correspond exactly with Alternative E.

### Alternative H -(Deconsolidation/Reclamation)

Under Alternative H, the Richmond Beach site impacts would be the same as under Alternatives E, F and G, which would provide secondary treatment in an equivalent manner.

In addition, the Kenmore outfall would be constructed through the Richmond Beach service area to the beach. For two miles through the service area, running approximately east-west from the existing plant site, outfall construction would pass through residential, intertidal, nearshore and offshore areas. Moderate, limited, temporary impacts on soil profiles, topography, erosion, deposition and water quality (turbidity) could occur. Disturbances such as noise, dust and traffic disruption would occur.

In Puget Sound, the new outfall would increase Richmond Beach area flow 9 times; solids and BOD would double over Alternative B. Overall, the flow would be approximately 6 times larger than Carkeek Park and one-sixth the West Point flow. During ebb and flood tides, the diluted effluent would not be expected to be brought ashore, but this is a possibility during slack water. Because studies of Richmond Beach offshore, nearshore and intertidal biota have not been made, the impacts of increased flow are difficult to assess. However, in general increases in BOD and solids could be expected to have moderate adverse impacts on benthic organisms; higher metals levels in intertidal biota may follow. Under and over-chlorination could continue unless operating methods were altered.

## Mitigation Measures

Possible mitigation measures to alleviate or eliminate adverse impacts for the Richmond Beach site and service area include the following:

1. Providing a standby power system to pumping stations where power failures could result in sewage overflows to Puget Sound.

   (Alternatives B, C, D, E, F, G, H)

2. Improving the chlorination system to pace chlorine feed with effluent flow rates, thus avoiding underchlorination (and possible public health impacts) or overchlorination (and possible toxic effects on biota).

   (Alternatives B, C, D)

3. Conducting a comprehensive study off Richmond Beach to accurately determine existing water quality, biology and currents before constructing the new Kenmore outfall there.

   (Alternative H)

4. Operating chemical addition and enhanced primary treatment at Richmond Beach all year to reduce loads of solids, metals and other parameters to Puget Sound.

   (Alternatives C and D)

5. Considering carefully the route and scheduling of Kenmore outfall construction to minimize disruption.

   (Alternative H)

## Unavoidable Adverse Impacts

The remaining adverse impacts on water quality, biology, socio-economics, sites, costs, energy and natural resources that could not be mitigated by the previously mentioned measures under each alternative would be unavoidable adverse impacts.

# DESCRIPTION OF THE PROPOSAL

A. Name of the Proposal and Sponsors

This information is contained in the Introduction and in the Summary of Draft EIS Contents

B. Location of the Project

The project location is described in Chapters I and III of the Draft EIS.

C. Other Agencies File Numbers on Proposal

The reader is requested to contact Mr. Roger Mochnick (EPA), Mr. John McDonnell (DOE), and Dr. Peter Machno (Metro) for this information.

D. Identification of Construction Phasing and Future EIS Requirements.

Chapter III contains this information.

E. Description of Physical and Engineering Aspects of the Project

Projects are summarized in the Draft EIS and detailed in the Draft Facility Plan.

F. Land Use Plans and Zoning Regulations

Chapter II of the Draft EIS describes existing and projected land use; Chapter III addresses whether the proposal is consistent with these regulations.

# PREFACE

This Draft Environmental Impact Statement (EIS) Series evaluates the impacts of the Metropolitan Seattle Wastewater Facilities Plan. The Municipality of Metropolitan Seattle (Metro) would construct and operate the wastewater facilities, for which the major part of the capital costs could be provided by construction grants from the Environmental Protection Agency (EPA) and the Washington State Department of Ecology (DOE). Under consideration in the various alternatives are wastewater treatment plants, transfer interceptors, combined sewer overflow techniques, and sludge facilities.

The EIS Series has been prepared in response to federal and state legislation plus local resolutions requiring that EPA, DOE and Metro each fully consider the environmental impacts and consequences of proposed projects prior to making a final decision to proceed on a recommended project. The respective responsibilities for the three agencies in the EIS process were established for EPA in The National Environmental Policy Act (NEPA), 42 U.S.C. Sec. 4321, et seq.; for DOE in the Washington State Environmental Policy Act (SEPA), RCW 43.21 (c); and for Metro in Metro Council Resolution No. 2582.

In certain cases, it appeared to the three agencies that significant environmental impacts could result from the various wastewater facilities alternatives. For example, it appeared that alternatives for Metro's West Point, Alki and Carkeek Park wastewater treatment plants may have significant environmental impacts; similarly an evaluation of facilities on a regional level indicated that some significant impacts should be considered. Therefore, a decision was made to prepare an EIS on these projects to comply with both NEPA and SEPA requirements. Rather than preparing separate EIS documents at the appropriate time, the three agencies agreed to prepare a joint EIS for the regional facilities alternatives, plus the West Point, Alki and Carkeek Park alternatives. In addition to satisfying both NEPA and SEPA with the joint EIS, the agencies also chose a procedure designed to eliminate delays and duplication of effort as well as to facilitate desirable interchange among the agencies and with the public during the early stages of the EIS process.

# Preface

In other cases it appeared as though facilities would not cause significant environmental impacts as defined in NEPA. Therefore, an EIS pursuant to SEPA (which would also serve as an environmental assessment) was prepared for the Richmond Beach site and service area. This volume is that EIS pursuant to SEPA.

For the total evaluation of the environmental impacts of alternative facilities plans, the environmental analysis has been organized as follows: Regional Analysis EIS (Volume I), West Point Treatment Plant EIS (Volume II), Alki Treatment Plant EIS (Volume II), Carkeek Park Treatment Plant EIS (Volume II), and Richmond Beach Treatment Plant EIS (pursuant to SEPA) (Volume II).

The production of the joint Draft EIS series results from close cooperation between EPA, DOE and Metro. All three agencies have been intimately involved with the review, analysis, supplementations, and synthesis of materials furnished by independent consultants hired to assist with the preparation of the EIS. The City of Seattle, King County, and the Puget Sound Council of Governments have also participated in meetings and provided comments on preliminary draft materials for the EIS. However, only Metro and DOE have actual responsibility for the SEPA EIS for Richmond Beach.

SEPA guidelines have been followed in preparing the EIS for Richmond Beach.

All comments on this Draft EIS should be sent to Metro as the lead agency under SEPA. Comments should be addressed to Dr. Peter S. Machno, Municipality of Metropolitan Seattle, 600 First Avenue, Seattle, Washington 98104. Metro will then distribute copies of the comments to DOE and the EIS consultant. Comments will be used by the agencies in their decision-making processes.

It is believed that this process best enables the agencies involved to fully assess and consider all significant physical, economic, and social effects of their proposal, and public input thereon, prior to any significant decision-making step. For this reason, the agencies have not attempted to bias the decision to be reached by recommending any one of the eight alternatives prior to full completion of the EIS process, including the public hearings. Rather, the attempt of this document is to present the decision makers and the public with as complete an analysis as possible of each of the alternatives so that a fully informed decision can be made.

The remaining part of the decision-making process will proceed under the following schedule:

| | |
|---|---|
| October 25, 1977 | Public hearing on Regional Draft EIS |
| November 2, 1977 | Public hearing on Richmond Beach Draft EIS |
| November 1977 | Metro Council recommends a preferred alternative |
| February 1978 | Final EIS is available |
| March 1978 | Public hearings on Final EIS |
| April 1978 | Metro Council decision |
| April 1978 | DOE decision |
| April 1978 | EPA decision |

# CHAPTER I

# BACKGROUND

The Richmond Beach wastewater treatment plant is one of five Metro treatment plants that will be affected by the wastewater management alternatives being considered in the Draft Facility Plan (Metropolitan Engineers, 1977). Figure 1-1 shows the treatment plants' locations and the service areas tributary to each. This Draft EIS, Volume II, presents the impacts of eight regional alternatives on the Richmond Beach plant and service area. Impacts of the alternatives on the regional level and a background of the regional issues are discussed in Volume I.

The Richmond Beach plant serves about 3650 acres adjacent to Puget Sound in the northwesterly portion of King County. The tributary area is almost entirely residential producing typical domestic sewage with no appreciable industrial load.

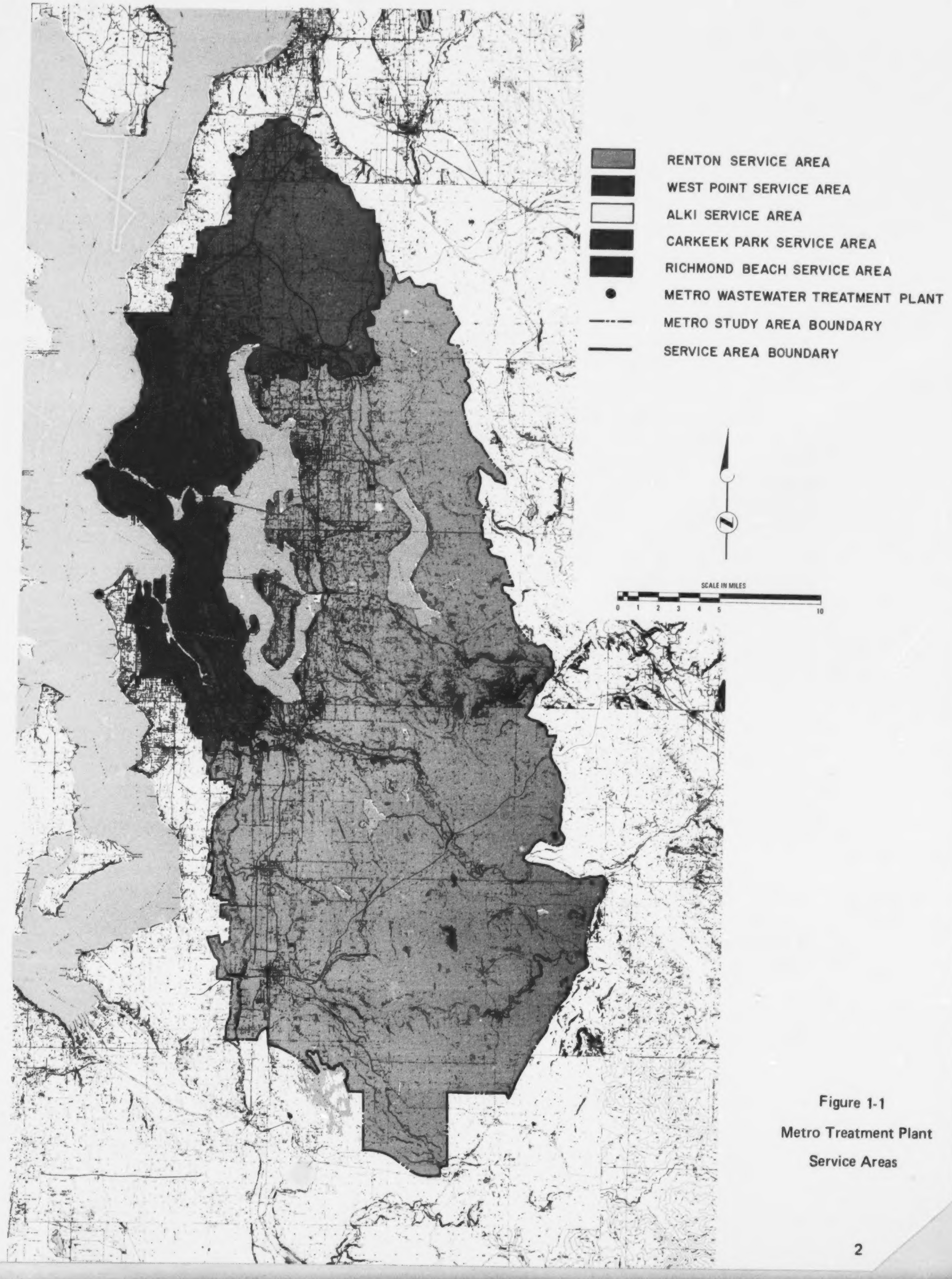
An aerial view of Richmond Beach is shown in Figure 1-2. The treatment plant is located on a 3.75 acre site on the northwesterly corner of the service area. The primary treated effluent is discharged by a submarine outfall to Puget Sound. Construction, completed in 1963, cost $740,000.

At present, four operating personnel are required to staff the facility, which has an operating cost of $127,000/year. Traffic generated by the plant operations amounts to 5 round trips/day including about 1 round trip/day for sludge hauling.

More detailed descriptions of the service area and treatment facility are included in Chapter III under the "No Action" alternative.

## SITE CONSTRAINTS AND ISSUES

There are no major problems associated with operation


RENTON SERVICE AREA
WEST POINT SERVICE AREA
ALKI SERVICE AREA
CARKEEK PARK SERVICE AREA
RICHMOND BEACH SERVICE AREA
● METRO WASTEWATER TREATMENT PLANT
METRO STUDY AREA BOUNDARY
SERVICE AREA BOUNDARY
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SCALE IN MILES
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Figure 1-1

Metro Treatment Plant

Service Areas

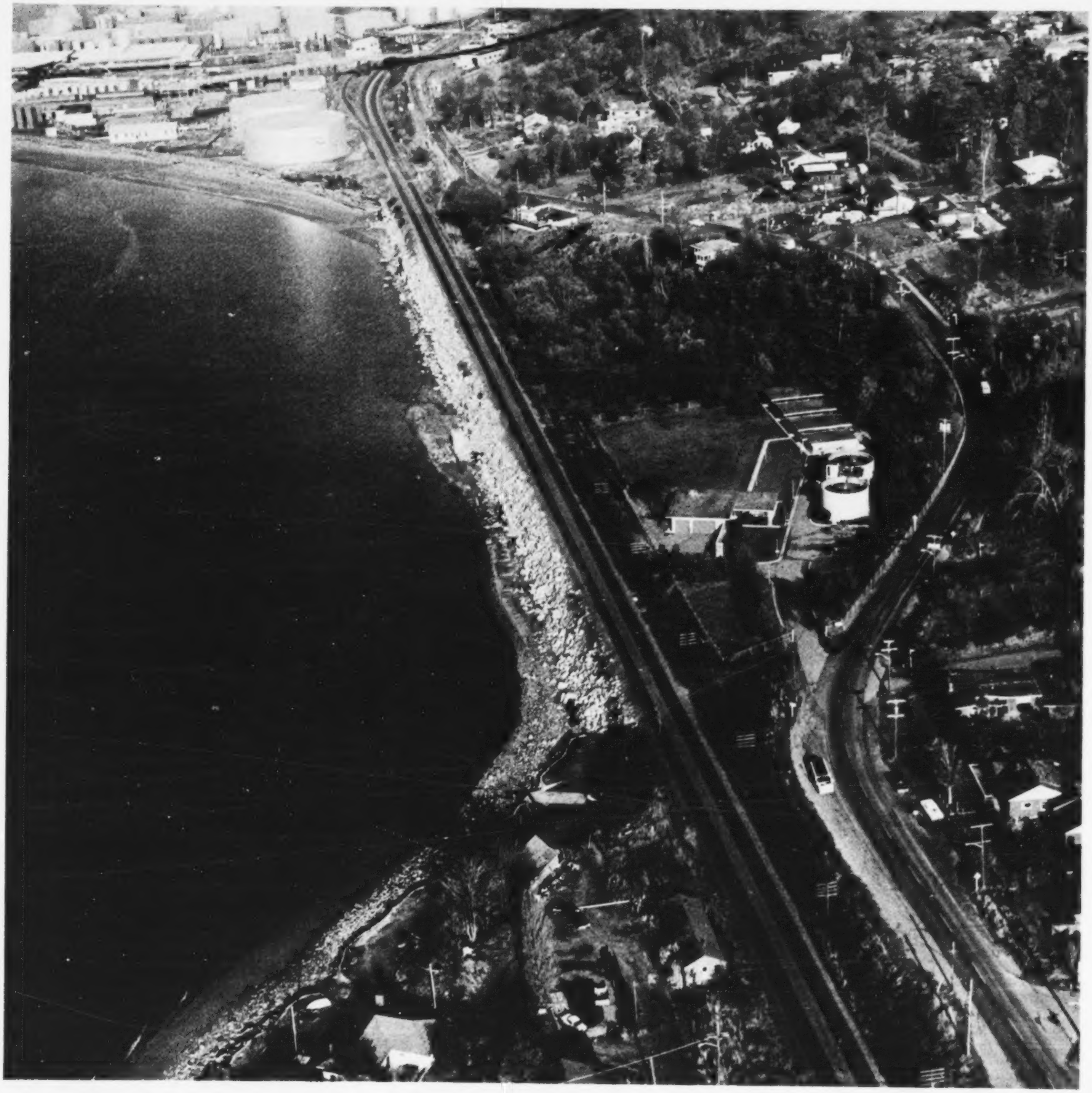


Figure 1-2
Aerial View of Richmond Beach — — Looking North

of the Richmond Beach plant, nor is future expansion impeded by site constraints. There is adequate vacant land owned by Metro available at the site to accommodate the facility's expansion for secondary treatment to comply with PL 92-500.

At the site, existing conditions appear satisfactory. Air pollution emissions from the existing plant are negligible in comparison to other local sources. There have been few public complaints reported about odors since the plant's constructon in 1967. Neither noise nor access are problems at the present site.

The only substantial adverse effect that could be associated with the plant operation to date would be on water quality at the nearby beach. Bacterial standards for commercial shellfishing are exceeded there, presumably due to the plant outfall influence. Since shellfish are found in the intertidal and subtidal zones off Richmond Beach, potential health risks could result.

At community meetings, Richmond Beach residents expressed no anti-expansion sentiment, but a concern that any new design should consider view, avoid odor, protect the environment, be compatible with zoning, and not increase traffic. A questionnaire showed two-thirds of those present at a community meeting favored secondary treatment, while the remaining people opposed it because they believed it to be unnecessary. The main regional issues concerned the possibility of amending PL 92-500, the question of the necessity for secondary treatment, comments on Metro's strategy and Interim Studies, and protection of Puget Sound and marine life. Citizens also questioned the equity of including southern Snohomish County in the Richmond Beach service area and the equitability of the present pricing system under which urban users subsidize suburban connections.

An additional public workshop was scheduled in June 1977 to inform citizens of the eight regional alternatives and seek their comments on the site-specific impacts of each. However, no Richmond Beach area residents attended.

# CHAPTER II

# EXISTING ENVIRONMENTAL CONDITIONS

## PHYSICAL ENVIRONMENT

### Topography

The Richmond Beach Wastewater Treatment plant is situated on a shoreline ledge above Richmond Beach and below residentially developed hills. The view of Puget Sound from homes above the Richmond Beach Wastewater Facility is unimpaired by the wastewater facility, because of the steep drop-off to the plant site. Furthermore, vegetation conceals much of the facility. Bordering the facility to the west is the Burlington Northern Railroad Line; to the east is Richmond Beach Drive. A depression in the northern portion of the site is a collection point for groundwater received from a culvert under Richmond Beach Drive; the culvert drains a small ravine to the northeast of the site (as shown in Figure 2-1).

### Geology and Soils

The soils in this area are mostly dense and cohesive, difficult to excavate by hand or with light power equipment, and provide fair to excellent foundation stability with few problems from settling. The till may stand in steep cut slopes greater than 30 degrees except where silt or clay binder is present.

Soil associations are of the Alderwood-Everett series composed of silty and sandy soils with coarse fragments, formed in glacial materials. Everett series covers terraced areas (alluvial plains), and is formed of glacial outwash consisting of gravelly, sandy loam 20 to 36 inches over gravel and sand. The subsoil permeability is rapid (5 to 10 inches per hour).

Alderwood soils generally cover the upland areas and are formed from glacial till consisting of gravelly, sandy loam 20 to 40 inches over cemented till. Surface permeability is 5 to 10 inches per hour with substratum permeability being much slower (less than 0.05 inch per hour). All soils in these two classifications are subject to moderate erosion.

The glacial deposits mentioned above are generally found in higher ground and constitute the easterly slope. Fill material to the north of the existing plant, and to the west of Richmond Beach Drive, cover part of the natural deposits. Soft silty muck covers the lower flat at the westerly portion of the site near the railroad tracks. Much of the lower area is submerged under high tide and is covered in part with water drained from the north and the east. To the west of the railroad tracks, a gravel beach extends to the north and the south.

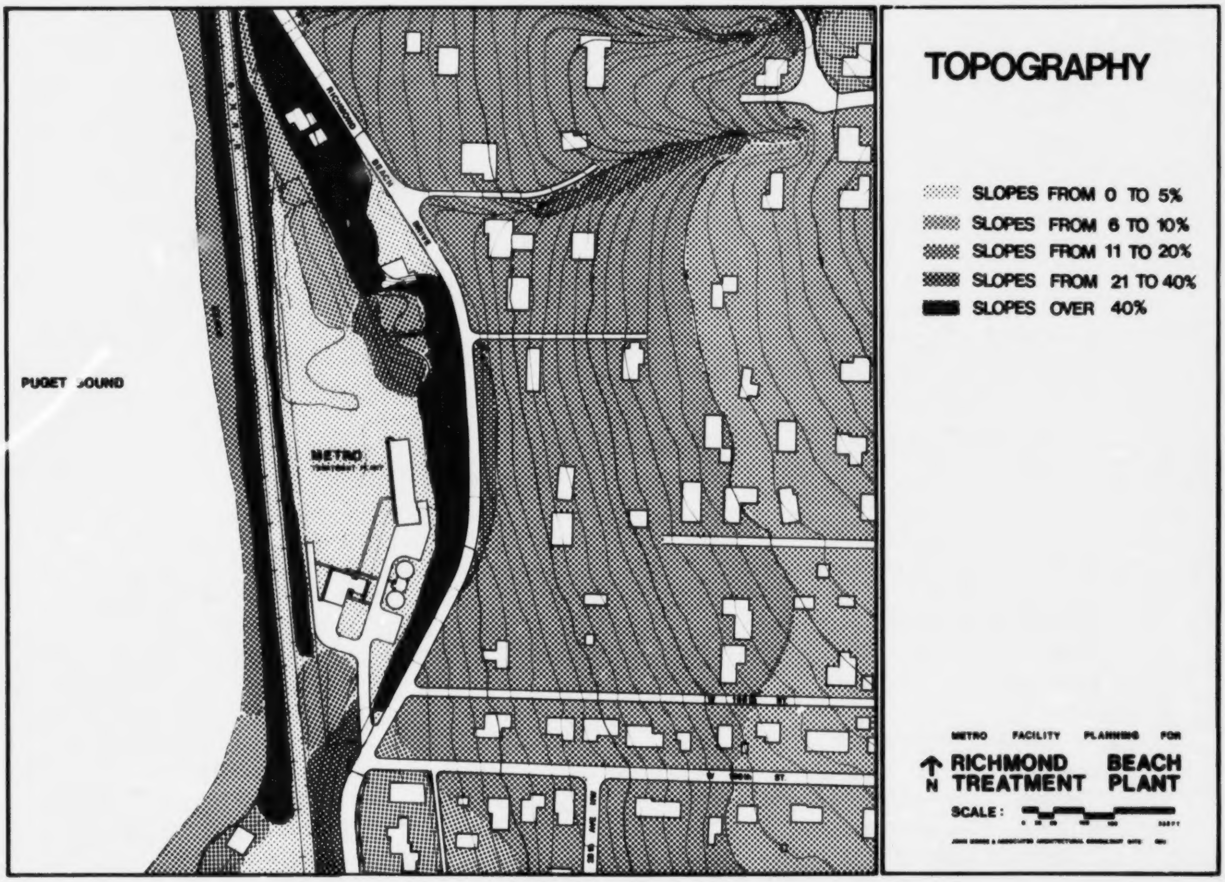


Figure 2-1

Richmond Beach

## Existing Environmental Conditions

Precautions should be taken to avoid mud slides. Slides have occurred along the shoreline just south of Point Wells, in the banks above the rock revetment and railroad tracks.

More detailed information on foundation engineering is included in Metropolitan Engineers Task B5.

## Seismology

The Pacific Northwest area is considered to be seismically active. Earthquakes can rupture or weaken pipelines and structures, and the slow continuous movement that occurs along an active fault line can also rupture pipelines if provision for this movement is not considered in the original installation. No specific fault lines have been identified within the Richmond Beach service area, but measurable tremors have been recorded. In 1970 a tremor of intensity V on the Modified Mercalli scale and magnitude 3.9 on the Richter scale had its epicenter in the Richmond Beach area. One can therefore assume that some structural damage may have occurred to the collection system specifically sewered with rigid joint construction providing access both for groundwater infiltration and sewage exfiltration.

## Seismic Hazard

The maximum seismicity experienced in the last 133 years on Alderwood soil was VII on the Mercalli (Rasmussen, Millard & Smith) scale. So on Alderwood deposits, the seismic risk is generally low.

However, in fill areas, a class VII seismic event (on the Mercalli scale) would be felt every 20 to 40 years, so extensive precautions for earthquakes should be taken in regions of fill. Before building here, one must study the surface conditions and plan accordingly. Earthquake damage could result from soil liquefaction, differential compaction or settlement of soils and ground shaking.

## Climate

Richmond Beach's climate is the mild marine type, strongly influenced by the surrounding terrain and its proximity to the Pacific Ocean. The wet season begins in October, reaching a peak in the winter, reducing in spring, with the least rain occurring during the June - September summer season. The average annual rainfall for the Richmond Beach service area, as measured at the treatment plant, is about 39 inches per year (slightly less than the Metro area).

## Air Quality and Odors

Air masses move parallel to the shoreline, restricted on the east by bordering bluffs and hills and unrestricted on the west. Coastal zone entrapment occurs when air held against the bluffs and hills contains emissions along the Puget Sound shoreline. The Richmond Beach site met ambient air quality standards for sulfur dioxide and particulate matter, but violated the hydrocarbon standard. A summary of pollutant concentrations for the Richmond Beach-Carkeek Park area is given in Table 2-1 (HRPI, 1976).

Although some odors are detectable close to the facility, they are diluted by prevailing winds. Further, they are masked by more potent odors from the Point Wells oil installation. Odors are also emitted by intermittent trucks and auto traffic on the adjacent roadway.

Local areas potentially sensitive to odor are the adjacent residential districts and the beach. The potential for odor is a function of the various treatment processes included in the alternatives.

## Noise

The Richmond Beach facility generates a continuous noise level of 50 dBA, which is not considered to be a problem as the sound is steady and contains a broad band of frequencies. Absolute levels in a proposed city/county ordinance would be 55 dBA for daytime, 45 dBA for evenings and weekends. The existing facility at the adjacent residential property line then would be 5 dBA over the allowable evening level. This excess is permitted by exemptions provided sewage treatment plants under Section 602 of the King County Ordinance (Source: Curt Horner, Coordinator of the Noise Abatement Program, Seattle-King County Department of Health.) Construction impacts would be exempt during the daytime (7 a.m. to 10 p.m. weekdays, 10 a.m. to 10 p.m. weekends).

Intermittent noise sources on site include trucks along Richmond Beach Drive originating from Point Wells and, rarely, from the treatment facility; automobiles; passing trains; and beach activities in summer. Noise levels are generally lower at night.

Sensitive receptors would be adjacent residential areas and beach users. An increase of 10 dBA is considered to be an intrusion.

Table 2-1

Summary of Pollutant Concentrations
(Micrograms per Cubic Meter)

| | From Outside Service Area | Generated Within Service Area |
|---|---|---|
| **Sulfur Dioxide** | | |
| Richmond-Carkeek | 52 | 62 |
| PSAPCA Standard: 230 for 24-hour average | | |
| **Nitrogen Dioxide** | | |
| Richmond-Carkeek | 160 | 137 |
| PSAPCA Standard: 100 for annual average | | |
| **Particulates** | | |
| Richmond-Carkeek | 50 | 39 |
| PSAPCA Standard: 150 for 24-hour average | | |
| **Hydrocarbons** | | |
| Richmond-Carkeek | UKN | 503 |
| PSAPCA Standard: 160 for 3-hour average | | |

# Existing Environmental Conditions

## Water Resources

### Hydrographic Features

RIBCO's Urban Runoff and Basin Drainage Study of 1974 identified existing water channels and conduits within the Richmond Beach service area in an attempt to estimate present and future flooding and erosion problems. Boeing Creek, with an estimated drainage area of 2.9 square miles, was identified as being one of the few remaining natural creeks in the county.

Heavy stormwater runoff created by suburban development in the uplands has caused streambed erosion along Boeing Creek, sedimentation in Hidden Lake and considerable delta formation on Puget Sound. Hidden Lake covered an area of 2.4 acres before it became silt-laden. It was once the water supply for the Highlands and is still fed by three artesian wells.

The relative abundance of wells in the Richmond Beach service area indicates that a fairly substantial groundwater supply exists. Groundwater supplies in the study area are generally contained in unconsolidated sedimentary deposits. Aquifers having the most favorable water-bearing properties are contained in alluvium, gravel, sand deposits, or recessional outwash.

Puget Sound borders the service area for a distance of approximately five miles. It is one of the deepest saltwater basins in the United States. The average bottom depth of this glacially-modified "U"-shaped basin is 600 feet below sea level with the bottom tending to drop off sharply a short distance from shore.

### Water Quality

The water quality of Puget Sound is a function of all point and nonpoint nutrient sources, circulation patterns, oscillating tidal action and wind. The circulation of seawater is driven by the constant addition of freshwater, which forms a lens over the more saline waters and flows northward, and by the subsequent influx of mid-depth seawater. Nutrient sources include deep ocean inflows, storm runoff, sewage treatment plant discharges and industrial effluents.

## Existing Environmental Conditions

The waters off of the Richmond Beach sewage treatment plant are classified as Extraordinary or Class "AA" by state water quality standards, despite the various waste inflows. This classification is based on water quality criteria such as coliform counts, dissolved oxygen concentrations and aesthetic values.

Surveys of water properties in Puget Sound were initiated in 1932. Further studies were undertaken in August 1974 to determine water quality profiles in the vicinity of the treatment plant outfall. During periods of high and low water stand, discharged effluent will concentrate in the vicinity of the outfall resulting in elevated nutrient concentrations. The temperature, salinity, dissolved oxygen and density patterns are also affected during this period of low circulation. Fecal coliform counts at the shoreline occasionally violate state standards. This may be attributed to known septic tank failures of residences just south of the treatment plant or onshore winds or eddy currents carrying sewage effluent toward the shoreline.

Effluent discharged from the Richmond Beach treatment plant has a vertical distribution most likely controlled by the density profile over the outfall at the time of discharge. This density structure (as well as the effluent distribution) was investigated more fully around the West Point outfall and found to be highly variable in time and space. Tidal mixing, especially in a strong tidal flow, was found to be relatively inefficient and effluent patches retained their identity through several tidal phases. It is assumed that the density profile off Richmond Beach is similar to that off West Point, and therefore that the effluent may not be effectively diluted by tidal action.

The Puget Sound hydraulic model indicates that the prevailing tidal currents off Richmond Beach parallel the shoreline; flood tides running southward, and ebb tides flowing northward. The net flow of effluent discharged from Richmond Beach is seaward because the diffuser discharges at a depth less than the no-net motion layer (150 feet). This net seaward movement coupled with the design dilution ratio of 100 to 1 are factors influencing water quality conditions at Richmond Beach. These longer, slower, net water movements are not to be confused with tidal currents which develop. Current reversals due to tidal movements take place within an hour and lead to short-term onshore currents.

# Existing Environmental Conditions

## BIOLOGY

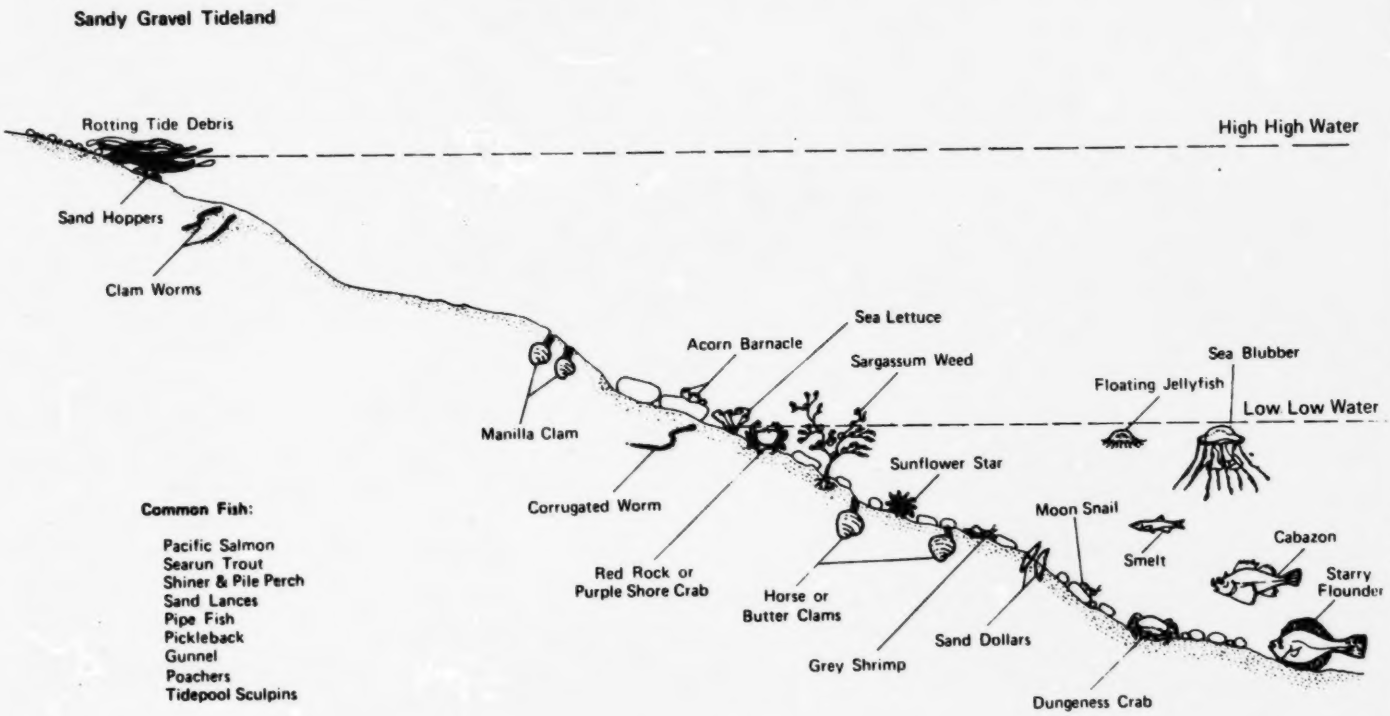
### Terrestrial Biology

Young alder and willow trees grow together to form a dense grove to the north of the plant which may provide refuge for rabbits, squirrels, chipmunks, songbirds, crows, and sparrows. Raccoons, weasels, and migratory fowl may frequent the groves, but probably do not nest there, since development of the Boeing Creek drainage has long since displaced larger wildlife. A mixture of alder, maple, cedar, and fir trees intertwined with blackberry vines provide additional food and habitat for fowl and small mammals to the east of the plant. Landscaping adjacent to plant structures includes maple, pine, and cherry trees, as well as juniper and laurel. The grassy area to the west of the plant may provide additional food for rabbits, gophers, and moles.

### Puget Sound Ecology

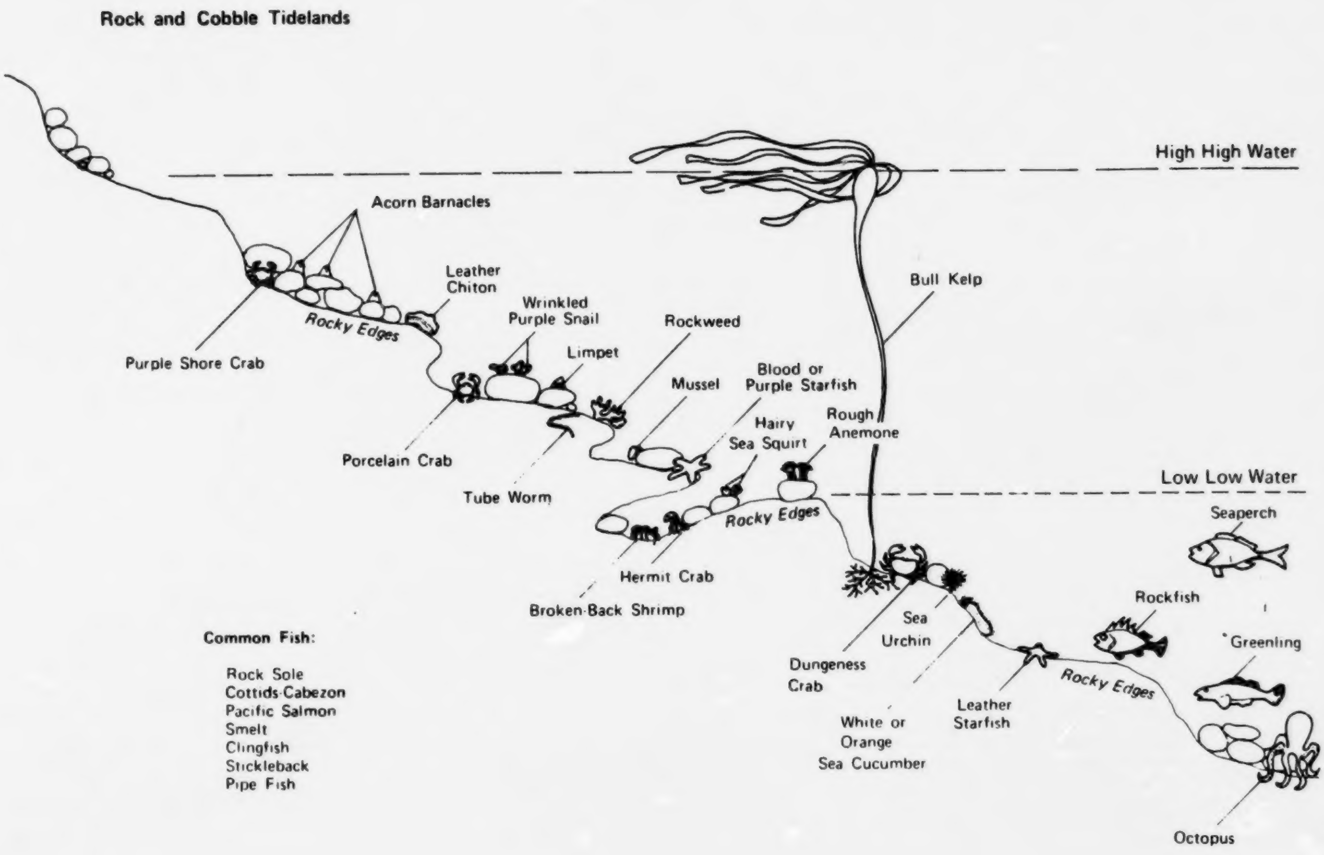
The Richmond Beach service area borders along five miles of Puget Sound. As at Carkeek Park, the principal water movements are primarily longshore, with onshore movement at slack water (based on the Puget Sound physical model). Fecal coliform standards are exceeded for shellfish waters, perhaps due to septic tank seepage from residences south of the treatment plant or from the above-mentioned eddy currents carrying sewage effluent toward shore. There are occasional combined sewer overflows from pumping stations.

The Richmond Beach area intertidal and subtidal environments are of the rock-cobble and sandy gravel types, as shown in Figures 2-2 and 2-3 (McGreevy 1973). Marine resources include intertidal and subtidal clams, crabs, octopus, geoducks, and fishes, including salmon. Bottom sampling, part of the Puget Sound Interim Studies, was not performed off Richmond Beach. The effects of effluent are assumed to be similar to those off Carkeek Park. Effects would occur to a lesser degree as at Richmond Beach initial dilution is better, grease is not a problem, and flows are smaller. Richmond Beach averages 1.5 mgd with peak flows of 7.6 mgd. Carkeek's average is 4.2 mgd with peaks of 20 mgd. However, subjective visual inspections indicated an apparently abundant and diverse assemblage of marine plants and animals. There is little or no quantitative data on the marine environment off Richmond Beach.



Richmond Beach Intertidal and Subtidal Environment

Figure 2-2



Richmond Beach Intertidal and Subtidal Environment

Figure 2-3

## Existing Environmental Conditions

### NATURAL RESOURCES AND ENERGY

Natural resources and energy impacts are not analyzed on a site-specific basis. Rather, these considerations are analyzed in the Regional EIS on an interrelated basis between the five existing Metro plants and potential new sites.

### HUMAN ENVIRONMENT

Many of the human environment facets pertinent to the Richmond Beach site are discussed and evaluated only in the Regional EIS. These include such topics as employment and costs, and many of the legal considerations. This necessity to treat certain topics on a regional basis stems from the interrelatedness of the plants and the trade-offs between alternatives.

Topics described in this volume include: land use, legal and institutional; agency and neighborhood goals; social, recreational, and cultural; archaeological and historical considerations; health and safety; and aesthetics and nuisance.

#### Land Use

The Richmond Beach facility sits on a ledge which was created by cut and fill. It is just above the beach and a major railway line. The bluff above the facility in part masks the facility from view.

King County Shorelines Management Program requires a permit of anyone wishing to build a structure exceeding $1,000 in cost or to alter existing conditions in the shoreline area. Expansion of the Richmond Beach facility would be included in this.

The King County Shoreline Master Program has classified the shoreline within the Richmond Beach facilities area as Urban (U). Much of the land in proximity to Richmond Beach has been classified as single family residence, medium security zone (RS 7200), with minimum lot size of 7,200 square feet. Commercial development occurs along Aurora Avenue, and industrial development is limited to Point Wells (Figure 2-4). Developed land use has increased over the past ten years, and is expected to continue to increase in the future.

The Richmond Beach facility is less than a half mile from the industrial development at Point Wells, which includes an oil refinery. The industrial development would tend to make the Richmond Beach facility less pronounced.

A mile south of the wastewater facility is Richmond Beach County Park. View of the facility from this park is blocked by a point of land.

## Legal and Institutional

The legal and institutional elements considered include shoreline management regulations and PL 92-500. The King County Shorelines Management Program has been previously described.

Public Law 92-500 is described in more detail in the Regional EIS. Basically, it would require the installation of secondary treatment facilities. NPDES permits would specify the time schedule for construction; this permit is still being negotiated.

## Agency and Neighborhood Goals

Agency goals are described in depth in the Regional EIS. They include the following:

The Puget Sound Council of Governments has proposed the Interim Regional Development Plan, which states:

> "Goal:
>
> It is in the public interest to minimize the costs of future growth by encouraging new development within urbanized areas where necessary investments in public services have already been made."

In further expanding on this goal the following policies are included in the proposed document:

1. Existing public utilities, facilities

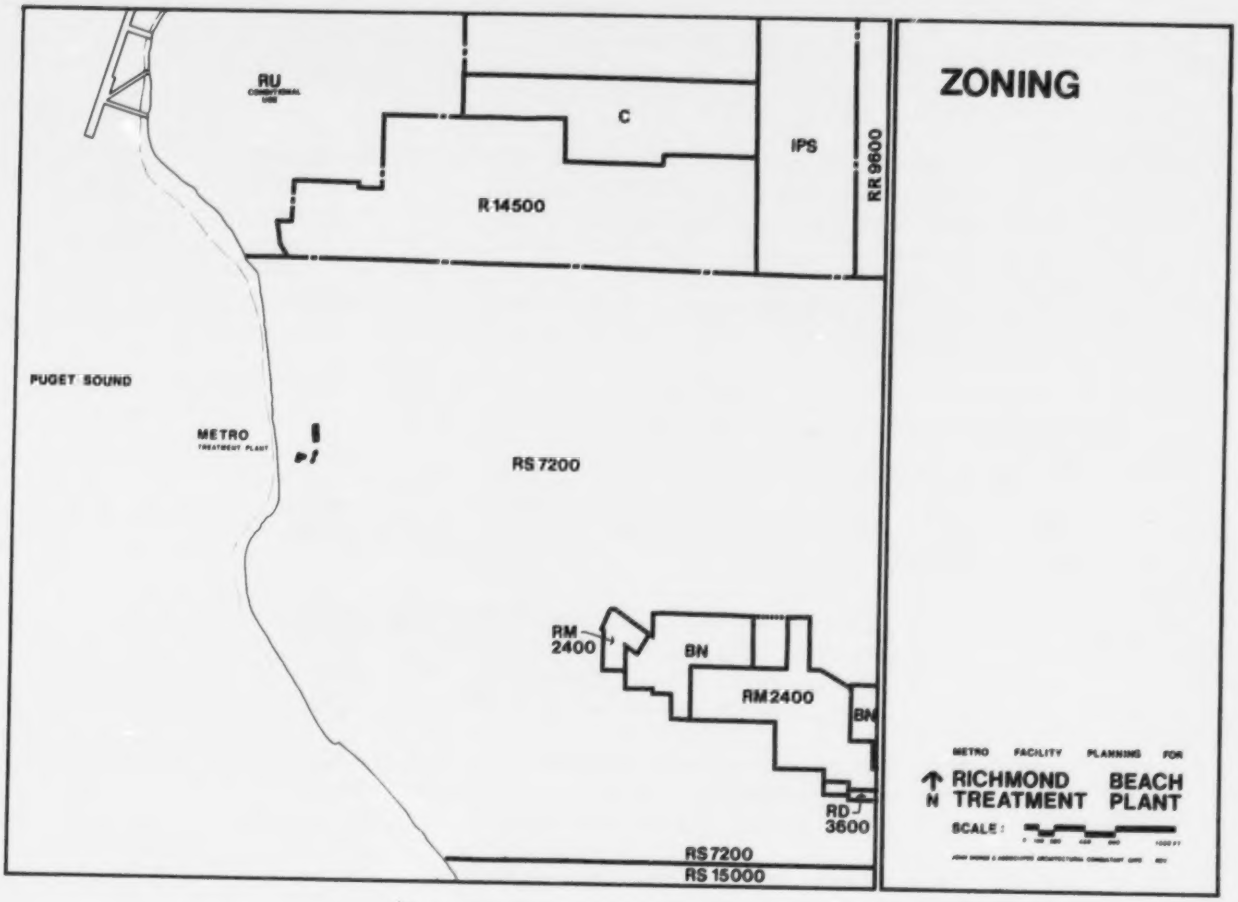


Figure 2-4
Zoning — — Richmond Beach

and services shall be used to their fullest prior to expansion.

3. Encourage conservation efforts and the maximum utilization of utilities and services before increasing supply.

5. The pattern of development which produces the least cost in new public utilities, facilities and services shall be encouraged within feasible limits.

7. Plans for public services shall be consistent with regional growth policies and local comprehensive plans and shall be based upon: 1) Criteria for population and employment distribution; 2) Policies designed to limit demand; 3) responsible fiscal management."

Another goal of the PSCOG document related to natural environment and amenities is the following:

"1. The natural beauty and liveability of this region shall be a primary consideration in the location, timing and quantity of growth.

   a. Natural amenities identified as important to the region's character and beauth shall be preserved or sensitively developed as a second choice.

   b. Patterns of development which minimize adverse impacts on these amenities shall be encouraged.

17. Permanent structures designed for human habitation, commerce, employment, or public assembly should not be located within high risk zines, including 100 yr floodways, earthquake zones, or active landslide zones.

25. Achievement or maintenance of water quality standards as established by law is recognized and supported."

## Existing Environmental Conditions

### King County

In 1964 King County developed a Comprehensive Plan. Certain provisions of this plan relate to the Metro Facilities Plan and are included as follows:

> "Utilities Development Policies:
>
> Trunk utility lines should be installed in advance or at the time of development in accordance with the general plan for the area. Local or service utility lines should be installed as needed.
>
> Where pollution conditions now exist, all possible steps should be taken to correct such conditions."

Neighborhood goals for Richmond Beach residents regarding the facility were expressed in a meeting held June 1, 1976, followed on November 15, 1976, by a joint Richmond Beach-Carkeek Park meeting. Relatively little concern was expressed about the location of the Richmond Beach plant, which was generally regarded as unobtrusive, although concern for maintaining its compatibility with the surrounding neighborhood was noted. Of special note were comments about traffic in the area, much of it from Point Wells, and about the importance of maintaining views for people living on the hill above the plant (Metro, 1977).

## Economics and Costs

A description of how costs are determined is developed in the Regional EIS. In summary, costs, whether existing or proposed, include three components: capital cost, operating and maintenance costs, and total annual costs.

The capital costs include the initial expenditures for construction of wastewater treatment plants, sewage collection systems, effluent disposal methods, combined sewer overflow facilities, sludge handling and disposal techniques, plus the purchase of land and miscellaneous treatment-related equipment. These capital costs typically are major expenses that are made infrequently and that can be phased to suit planning requirements. Because capital or construction costs can require large sums of money at one time, they are often financed by bonds or other types of loans that are paid back, with interest, over a period of several years. The yearly payment on the original capital cost debt is referred to as the annual cost of capital or amortized cost.

Operation and maintenance costs include expenses such as wages for labor, purchase of chemicals and power, and replacement or repair of equipment. These costs occur continually or at frequent intervals during the life of the project.

The total annual cost of wastewater facilities is the sum of the annual payment on amortized capital and the annual operation and maintenecnce costs. The payment of total annual costs can be achieved by various means, including charges to persons who use the services.

Since user charges are determined regionally, they are discussed in the Regional EIS.

## Employment

Employment considerations are developed in the Regional EIS. Employment directly related to wastewater treatment is best analyzed in the Regional EIS. Apart from these, no local jobs would be affected by any of the alternatives.

## Social, Recreational and Cultural

The aspects considered in the social, recreational and cultural category include neighborhood values and attitudes, shoreline use and cultural patterns.

The Richmond Beach area's cultural patterns and neighborhood values are basically unaffected by the Richmond Beach facility. It has been suggested that the Richmond Beach Community Club play an active role in policy decisions regarding plant aesthetics.

Just west of Richmond Beach wastewater treatment facility is a beach front. The facility does not directly deter beach usage, and any hindrance would be less than that imposed by the railway line which skirts the beach. Most beach recreational activity occurs at Richmond Beach Park.

## Archeological and Historical

No known historical resources are present. With respect to archeological resources, the Office of Public Archeology makes the following comment:

> "The Richmond Beach Treatment Plant Site has several existing structures. Additionally, an elevated railroad berm parallels the beach along its western margin. It would therefore appear that the only relatively undisturbed portion of this site is the area lying north of the present treatment plant and between the railroad berm and Richmond Beach Drive. If the proposed development is to include this area, we would recommend its advance reconnaissance by a professional archeologist."

## Health and Safety

Health and safety considerations include:

- Occupational safety
- Public health and safety related to the treatment facility and discharge point
- Existing health effects of combined sewer overflows
- Sludge handling
- Various construction activities such as the storage and transport of explosive or caustic chemicals.

The occupational safety record is generally in compliance with all applicable regulations.

The public health and water quality implications of sludge handling are described in the sludge management and groundwater portions of the Regional EIS.

Sludge trucks travel on roads which are heavily used by industrial traffic, and therefore would not constitute much additional safety risk.

## Aesthetics and Nuisance

Because the Richmond Beach facility is located below an embankment, surrounded by vegetation, and has a low profile, it is not readily visible from many angles; views toward Puget Sound from homes on the hills above the site are unobstructed by the plant. The facility's presence is not considered offensive. Odor is slight. Noise is at ambient levels.

The aesthetic nuisance of the facility is in part neutralized by the presence of the Point Wells industrial complex just north of the facility.

# CHAPTER III

# ALTERNATIVES AND IMPACTS

In this chapter, the alternatives and their impacts are discussed in detail. A general statement of the Facility Plan objectives, the major issues involved, and methodologies for selection of alternatives are discussed briefly below. Following a description of alternatives for the Richmond Beach service area, the environmental impacts are described.

## GENERAL

The regional alternatives developed in the Draft Facility Plan (Metropolitan Engineers, 1977) are described briefly in this chapter and evaluated in terms of environmental impacts and relation to the planning objectives of the study area. The objectives as identified in the facilities plan include: (1) provision of capacity to serve the wastewater needs of the area through 2005; (2) protection and/or enhancement of receiving water quality; (3) adherence to the goals and/or legal requirements of PL 92-500; (4) control of combined sewer overflows and; (5) development of effluent and sludge re-use.

The environmental impacts of the alternatives discussed in this chapter cover all of the elements of the environment discussed in Chapter II. However, emphasis will be on the following issues as related to Richmond Beach:

(1) The effects of alternative treatment processes (primary, enhanced primary, and secondary) on water quality, aquatic ecosystems, and public health;

(2) Social, economic, and public health effects of sludge handling and disposal methods;

(3) The aesthetic, social and legal compatibility of the alternatives with neighboring activities, land uses, community goals, comprehensive plans, and special codes.

### Alternatives and Impacts

In addition to the discussion of the primary and secondary impacts of the alternatives, other issues pertaining to each alternative such as unavoidable adverse impacts, measures that can be employed to mitigate the adverse impacts, and irreversible and irretrievable commitment of resources will be discussed for each alternative and compared to the other alternatives.

## DEVELOPMENT OF ALTERNATIVES FOR RICHMOND BEACH

Of the issues addressed in the Draft Facility Plan for developing regional alternatives, those of direct relation to Richmond Beach were: (1) compliance with secondary treatment requirements, and; (2) improvement in local water quality. The other issues of site constraints, costs and combined sewer overflows are not directly applicable to Richmond Beach alternatives development. The existing plant site is compatible with adjacent land uses and contains sufficient area for expansion and upgrading to secondary treatment. Costs of Richmond Beach alternatives, while a direct factor in selecting regional alternatives, would not be borne solely by Richmond Beach residents. Due to the Metro policy of uniform wastewater rates throughout the Metro area, the Richmond Beach community would bear a proportionate share of all facilities costs, as described in the Regional Analysis EIS (Volume I). Combined sewer overflows are not a problem in the Richmond Beach service area because the collection system contains separate sanitary and storm sewers.

Some of the considerations for Richmond Beach as developed in the Regional Alternatives include service area, treatment process, effluent disposal, sludge management, flow and waste reduction measures, and beneficial use of reclaimed water.

### Service Area

The Service area for Richmond Beach treatment plant would remain the same under all alternatives due to the extent of development in the area and the existing drainage pattern of the collection system.

### Treatment Processes

The wastewater treatment processes considered for Richmond Beach were primary, enhanced primary, and secondary treatment.

To comply with the secondary treatment requirement, addition of a biological process in some form would be required. Biological processes considered were tower trickling filters, rotating biological contactors and air activated sludge. These processes vary in the amount of land required, energy, costs and aesthetics. Based upon results of pilot studies, a comparison of environmental considerations performance and reliability, air activated sludge was recommended in the Draft Facility Plan for secondary treatment alternatives at Richmond Beach.

## Effluent Disposal

The Richmond Beach outfall appeared adequate for effluent dispersal, so no other alternatives were considered in the Draft Facility Plan. Under one regional alternative, a new outfall would be constructed from an inland secondary treatment plant at Kenmore to the vicinity of the existing Richmond Beach outfall.

## Sludge Management

Sludge is presently digested on-site and would continue to be treated at the Richmond Beach plant under all alternatives.

## Flows and Waste Reduction Measures

Domestic water conservation, infiltration and inflow reduction and pretreatment were considered in alternatives development for Richmond Beach.

### Domestic Water Conservation

Reduction in wastewater flows through adoption of domestic water conservation and re-use measures can be insignificant in terms of treatment plant size and costs in a service system with high rates of infiltration/inflow. Although Richmond Beach does not have combined sewers, infiltration and inflow to the present system can be as high as 1.4 and 4.0 mgd. respectively, while the base wastewater flow is only 1.2 mgd. Still, the influence of infiltration and inflow is less in the Richmond Beach system than other Metro collection systems.

As described in more detail in the Regional EIS, preliminary calculations indicate that a 25 percent decline in domestic water use within the Richmond Beach service area would reduce the cost of secondary clarifiers by $210,000, which amounts to 3.5 percent of the total cost of upgrading the plant to secondary. On a unit basis, this would be equivalent to saving $30 for each of the 7,000 residences in the service area; it is likely that costs to purchase household retrofit devices to achieve the assumed 25 percent decrease in water use may approximate the $30 per residence saving in plant construction costs. Therefore, domestic water conservation measures were not a major concern for the Richmond Beach service area.

## Infiltration and Inflow

To determine whether wastewater flows could be effectively reduced, a detailed infiltration/inflow analysis was conducted on the Richmond Beach collection system. The major portion of the collection system is a separate system; collection systems originally constructed as combined systems have been either completely or partially separated. Based on a total base wastewater flow of 1.2 mgd, (not including infiltration/inflow), the results of the analysis showed that the system infiltration varied from -0.2 mgd (exfiltration) during the summer season to a maximum of 1.7 mgd during the peak of the rainy season. Inflow rates vary with the intensity of specific storms; the maximum rate recorded was 4.0 mgd.

To assess whether the I/I is excessive or not, the estimated cost of removing incremental percentages of infiltration/inflow by rehabilitating the collection system were compared with costs for transporting and treating the flows if not removed. The estimated costs to rehabilitate the tributary collection systems to eliminate infiltration/inflow to minimum "new sewer" standards were $8.3 million. The estimated additional capital cost for the new secondary facilities to transport and treat the flow would be $0.73 million; annual operation and maintenance costs would be $61,500.

Since the rehabilitation cost would be higher than the transportation/treatment of the infiltration/inflow, it was concluded that the I/I of the overall collection system is not excessive according to the definition above. However, a close analysis of each element of the system indicated that inflow from the connected roof and area drains in the Highlands sewer district is excessive. Disconnection of these sources would reduce peak inflow by 1.0 mgd at an estimated cost of $97,000 to the Highlands sewer district. Proposed secondary treatment facilities at the Richmond Beach treatment plant could then be reduced from a peak hydraulic capacity of 9.0 mgd to 8.0 mgd, producing a capital cost savings of $128,000 and an annual operation and maintenance savings of $4,100.

The impact of exfiltration would not be localized but rather covers the portions of the service area where groundwater is below the sewers. The exfiltration would result in contamination of groundwater and would be a health hazard if groundwater were to be used as a source of water supply. The contaminants are ultimately diluted by the large volume of groundwater. However, since groundwater is not used for municipal supply in the Richmond Beach service area, exfiltration would not pose an immediate health risk.

### Industrial Pretreatment

The major industries contributing to the Richmond Beach treatment plant are the Chevron Asphalt and Standard Oil Companies which operate oil related processing facilities at their Point Wells site. The industries operate a joint industrial waste treatment facility which directly discharges to Puget Sound. However, the sanitary sewerage from both plants and phenolated water from the Chevron Asphalt distillation unit have been discharged to the municipal treatment facility. The flow is approximately 0.01 mgd which is insignificant compared to the total flow reaching the facility. The quantities of phenol and heavy metals in the wastewater are within those allowable by Metro for a single discharger, so pretreatment would not significantly affect wastewater loads to Richmond Beach.

## Beneficial Use of Reclaimed Water

As discussed in the regional report, it is unlikely that any water reclamation would be justifiable in the Seattle metropolitan area, where local sources of good quality water are available at lower cost than reclaimed water. In the Richmond Beach service area, the absence of industries and agricultural lands further reduces the potential for reclaimed water re-use, so re-use was not considered in the Draft

Facility Plan.

## REGIONAL ALTERNATIVES

The eight regional alternatives as described in the Draft Facility Plan are described briefly to illustrate how Richmond Beach and Kenmore facilities would fit into the Metro regional wastewater system. Specific alternatives for the Richmond Beach service area are described in the section following.

Eight alternatives on the regional level are being considered and evaluated by the Draft Facility Plan. These alternatives differ in the degree to which issues such as cost, water quality, and compliance with federal and local policies and goals are addressed. The regional alternatives consist of one "no-action" alternative, one alternative which continues unchanged the present comprehensive plan for the study area, two which emphasize combined sewer overflow abatement with minimal treatment upgrading, and four alternatives which achieve secondary treatment with variations on combined sewer overflow controls, site impacts and re-use options. The secondary treatment alternatives E through H are the only alternatives that comply with the secondary treatment requirements of PL 92-500. The eight alternatives are described below and are shown in Figure 3-1.

### Alternative A - No Action

No capital expenditure would be made for expansion, modification or upgrading of treatment plants and no construction of new interceptors during the planning period (until 2005). Alternative A is evaluated to meet SEPA "no action" requirements.

### Alternative B - Metro Comprehensive Plan
### (No Action Pursuant to PL 92-500)

Plant upgrading and transfer interceptor construction would be done according to the Metro Comprehensive Plan. Alternative B is evaluated as the "no action" alternative pursuant to PL 92-500 and NEPA requirements and serves as the baseline for other alternatives. Puget Sound plants (West Point, Alki, Carkeek Park and Richmond Beach) would be retained with primary treatment. Improved sludge manage-

NO ACTION

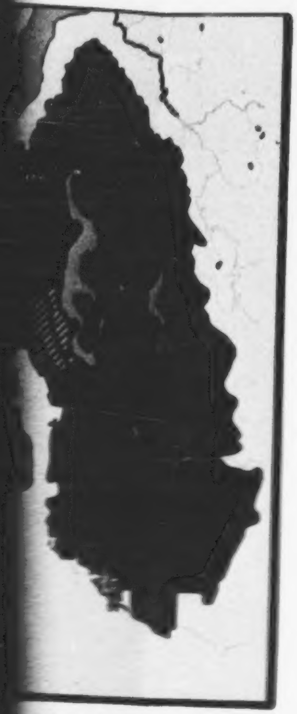
COMPREHENSIVE PLAN
(NO ACTION PURSUANT
TO PL 92-500)

MAJOR CSO CONTROL

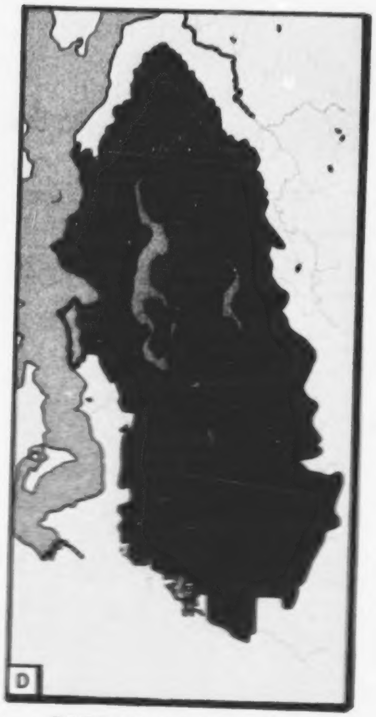
SECONDARY

SECONDARY
SOUTHERN STRATEGY

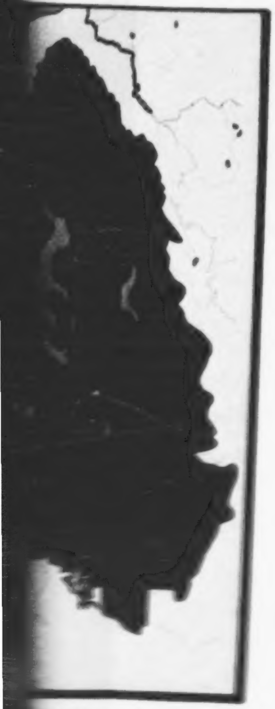
SECONDARY
WEST POINT PHASE OUT
OPTION



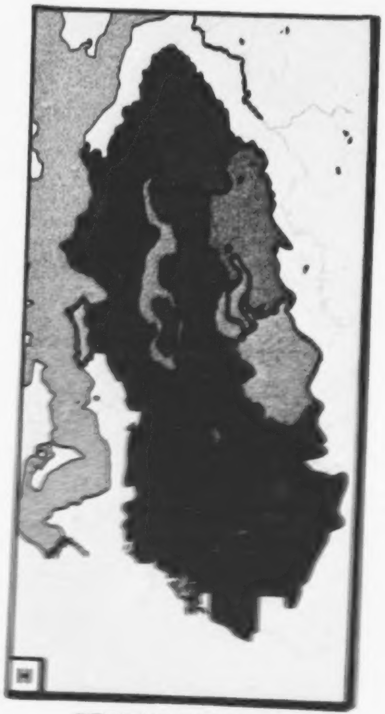
JOR CSO CONTROL



PARTIAL CSO CONTROL



CONDARY
INT PHASE OUT
OPTION



DECONSOLIDATION
RECLAMATION

**LEGEND**

- ■ RENTON
- ■ WEST POINT
- ▨ DUWAMISH (STORMWATER)
- ■ DUWAMISH (WASTEWATER)
- ▒ ALKI
- ■ RICHMOND BEACH
- ■ CARKEEK PARK
- ■ NORTH LAKE WASHINGTON
- ■ NORTH LAKE SAMMAMISH
- ▒ SOUTH LAKE SAMMAMISH
- ▨ PRESENTLY SERVED BY OTHERS

- ● WASTEWATER TREATMENT PLANT
- ○ STORMWATER TREATMENT PLANT

Figure 3-1

Metro 201 Facility Plan
Service Area Alternatives

ment and disinfection practices would be provided in Alternative B and all following alternatives. Four new transfer interceptors and improvements to the Alki outfall would be included.

### Alternative C - Major Combined Sewer Overflow Control

Major portions of combined sewer overflows would be controlled by transfer from fresh to salt water and/or treatment. The existing Puget Sound plants would be upgraded to provide enhanced primary treatment by physical/chemical treatment of solids during the summer. A new wet weather enhanced primary treatment plant would be constructed in the lower Duwamish industrial area and the Alki plant would be abandoned, both in 1995.

### Alternative D - Partial Combined Sewer Overflow Control

Wet weather combined sewer overflows would be reduced to Lake Washington, Lake Union and the West Seattle shoreline. The four Puget Sound plants would be upgraded to enhanced primary treatment with chemical addition during the summer for improved solids removal.

### Alternative E - Secondary

Secondary treatment would be added to the West Point, Alki and Richmond Beach wastewater treatment plants by 1985. The Carkeek Park plant would provide primary treatment for wet weather flows only beginning in 1985; dry weather flows would be pumped to West Point.

### Alternative F - Secondary/Southern Strategy

Secondary treatment would be provided at Richmond Beach and West Point (with a reduced service area). A major new secondary treatment facility would be constructed in the Duwamish industrial area in 1985; the Alki plant would be abandoned at that time. A new outfall at Alki Point would be built for discharging effluent from the Duwamish (and Renton) plants. The Carkeek Park plant would provide primary treatment for wet weather flows only beginning in 1985; dry weather flows would be pumped to West Point.

### Alternative G - Secondary/West Point Phaseout Option

Secondary treatment would be provided at the Alki and Richmond Beach plants. West Point would continue as a primary treatment plant for wet weather flows only, beginning in 1985. A new secondary treatment plant in the Interbay area (Commodore Way or Golf Park sites) would be constructed. The Carkeek Park plant would provide primary treatment for wet weather flows only beginning 1985; dry weather flow would be pumped to West Point

### Alternative H - Deconsolidation/Reclamation

Secondary treatment would be provided at West Point, Alki, Carkeek Park and Richmond Beach. Areas of growth would be served by new inland plants with local effluent and sludge re-use possible. Advanced waste treatment would be provided at new North and South Lake Sammamish plants. A new secondary plant at Kenmore would discharge treated effluent to Puget Sound.

Although there are eight regional alternatives, their component parts could be blended to develop a hybrid alternative, as described in Volume I, Regional EIS.

For the Richmond Beach site, the regional alternatives would result in the following set of options: no action (Alternative A); no action pursuant to PL 92-500, but with miscellaneous improvements (Alternative B); enhanced primary treatment (Alternatives C and D); and secondary treatment (Alternatives E, F, G, and H). An additional feature of Alternative H in the Richmond Beach service area would be construction of a new outfall from the Kenmore plant to Puget Sound off Richmond Beach. Table 3-1 summarizes alternatives for Richmond Beach.

TABLE 3-1

SUMMARY OF ALTERNATIVES

-RICHMOND BEACH-

|  | Alternatives |  |  |  |
|---|---|---|---|---|
|  | A | B | C and D | E, F, G and H* |
| Treatment Process | Primary | Primary | Enhanced Primary (1981) | Secondary (1981) |
| Capacity (mgd)-average/peak | 2.5/9 | 2.5/9 | 2.5/9 | 2.5/8 |
| Effluent Discharge Site | Puget Sound outfall | Puget Sound outfall | Puget Sound outfall | Puget Sound outfall |
| Sludge Management | Digestion on-site; trucked to Interbay pumping station for treatment at West Point | Digestion on-site; trucked to Interbay pumping station for treatment at West Point | Digestion on-site; trucked to Interbay pumping station for treatment at West Point | Digestion on-site; trucked to Interbay pumping station for treatment at West Point |

*Alternative H also includes the Kenmore outfall, which would be constructed through the Richmond Beach service area by 1983 and would ultimately discharge 21 mgd average/55 mgd peak flows of secondary effluent through a new outfall off Richmond Beach.

## ALTERNATIVE A (NO ACTION)

### General Description

In the No Action Alternative, the existing conditions at Richmond Beach would be allowed to continue without any further expansion or upgrading. The alternative serves as a tool for planning additions and modifications to the existing facilities by establishing the adequacy of such facilities and the minimum requirements for their best performance.

The following sections describe the service area,collection system, wastewater treatment facility and sludge management system under existing conditions, which would be the same as the No Action Alternative at Richmond Beach. More detail is available in the Draft Facility Plan for Richmond Beach.

### Service Area

The Richmond Beach treatment plant serves the Boeing Creek drainage area, shown in Figure 3-2. It covers about 5.7 square miles, or 3,650 acres, of which 3,480 acres lie in King County and 170 acres lie in Snohomish County. The service area extends from the Seattle city limits on the south to the Snohomish County line on the north and to Puget Sound on the west. The 1975 total service population was estimated at 20,000; the sewered population was approximately 17, 000.

Except for the minor amount of industrial flow discharged from the oil related process facilities at Point Wells Oil Complex in Snohomish County, the Richmond Beach tributary area is residential.

### Collection System

The Richmond Beach collection system consists of four separate entities. Three are sewerage agencies that serve primarily residential areas: (1) Ronald sewer district; (2) King County sewer district No. 3; and (3) the Highlands sewer district, all in King County. The fourth is the Point Wells industrial oil complex located in Snohomish County.

The Ronald Sewer district is the major discharger to the Richmond Beach treatment plant. It covers approximately 2,000 acres serving a population of 13,900 people. There

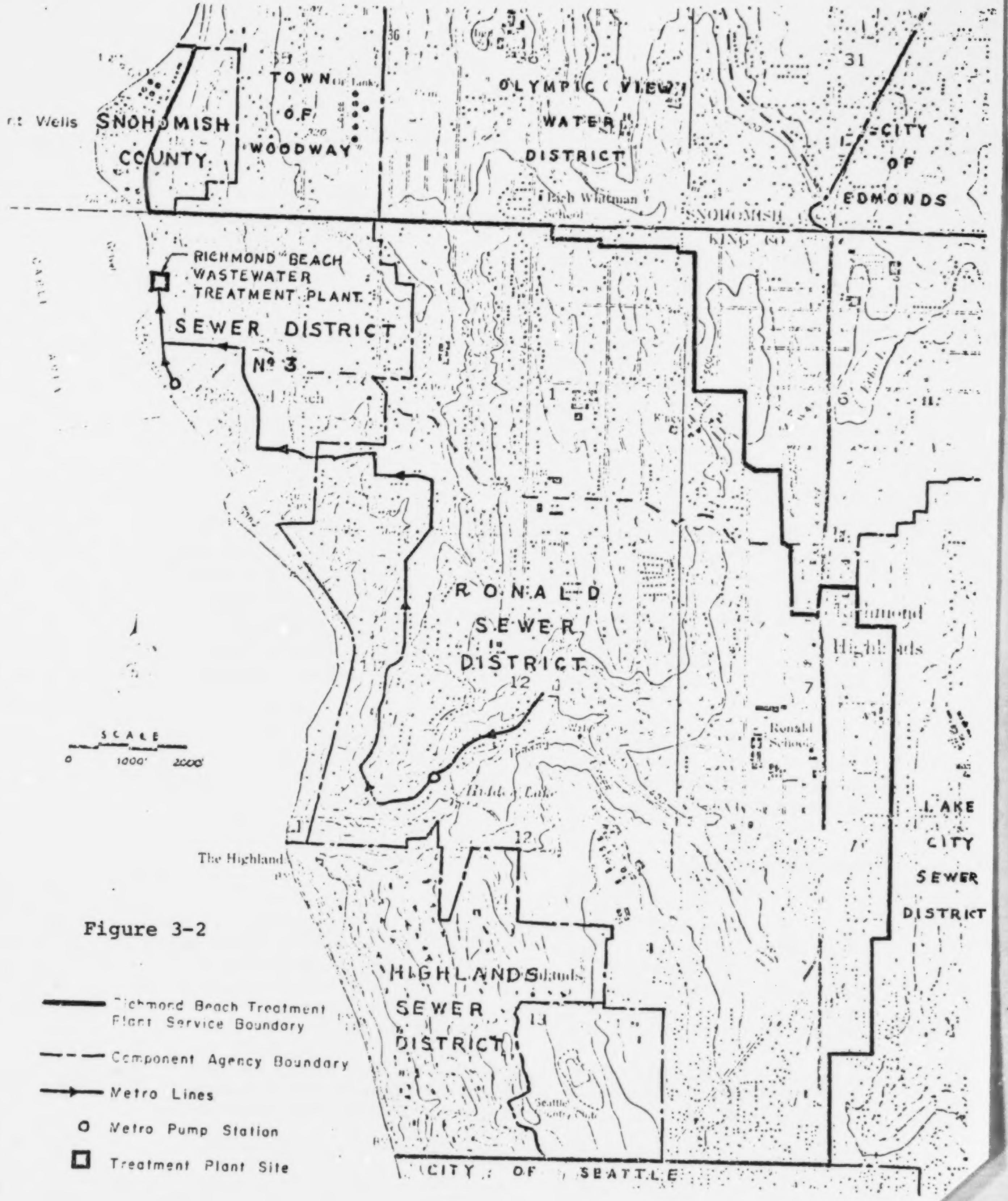

SNOHOMISH COUNTY
TOWN OF WOODWAY
OLYMPIC VIEW WATER DISTRICT
CITY OF EDMONDS
RICHMOND BEACH WASTEWATER TREATMENT PLANT
SEWER DISTRICT Nº 3
RONALD SEWER DISTRICT
HIGHLANDS SEWER DISTRICT
LAKE CITY SEWER DISTRICT
CITY OF SEATTLE
Snohomish Co
King Co
Richmond Highlands
Ronald School
Hidden Lake
The Highlands
Seattle Country Club
SCALE
0
1000'
2000'
Richmond Beach Treatment Plant Service Boundary
Component Agency Boundary
Metro Lines
Metro Pump Station
Treatment Plant Site

Figure 3-2

are six local pumping stations, with emergency overflow provided at each station. The overflow events from Ronald sewer district facilities have been limited to lift station No. 4 which has an overflow line directly to Puget Sound. The sewer system is a separate system and was first constructed in 1960.

The Highlands sewer district covers approximately 550 acres of private residential estates, and presently serves 360 people in 97 homes. A combined domestic sewage and storm drainage gravity system was originally installed in the 1920's which discharged untreated wastes to Puget Sound. In 1972 the system was partially separated by constructing a new sanitary sewer in an area where road gulleys were connected to the sewer. Although some roof leaders near house drainage sources were disconnected during the 1972 modifications, most of the house generated storm runoff still discharges to the sanitary sewer. Three local Highlands pumping stations have emergency overflows, while the Metro's Hidden Valley pumping station overflows back into the Ronald sewer district system.

King County sewer district No. 3 presently serves just under 3, 000 people in an area of approximately 380 acres. The original combined sewer system was constructed to discharge both sewage and stormwater, without treatment, to Puget Sound. Since that time the system has been separated by removal of surface drainage connections from the original system and the collected sewage transferred to a Metro interceptor. An emergency overflow is provided at each lift station.

Point Wells Oil Complex (Chevron Asphalt and Standard Oil Companies) operates oil related processing facilities at their Point Wells site. The industries operate a joint industrial waste treatment facility with discharge to Puget Sound. Since 1963, sanitary sewage and phenolated water from the distillation unit at Chevron Asphalt have been discharged to the Richmond Beach system.

The Metro interceptor picks up Ronald Sewer district flows in a 15-inch gravity line which discharges to Hidden Lake pumping station, where it is pumped by a force main and then by gravity and inverted siphon, to the Richmond Beach treatment plant. The Richmond Beach pumping station, located off Richmond Beach Drive, serves the southwest portion of King County sewer district No. 3. Emergency overflows are provided at both pumping stations. Overflows from Hidden Lake pumping station discharge back to Ronald sewer district's system, and overflows from the Richmond Beach pumping station discharge to the old King County sanitary district No. 3 Puget Sound outfall line. Due to power outages which have caused overflows to be discharged into Hidden Lake pumping station, Metro is installing an emergency generator set at the station.

## Adequacy of Richmond Beach Collection System

The collection system at Richmond Beach, including the pumping stations, is apparently adequate to handle the peak wet weather flows generated in the service area. Although emergency overflows are provided at all eleven local pumping stations and the two Metro stations, occurrence of overflows to Puget Sound have been reported only at two of these stations: pumping station No. 4 in the Ronald sewer district, and at Richmond Beach pumping station. Overflows occurring at Hidden Lake pumping station are due to power failures rather than inadequate pumping station capacity. The overflow discharges into pumping station No. 4, and ultimately into Puget Sound. With the installation of the standby generator at Hidden Lake pumping station, overflows at pumping station No. 4 will be reduced. Standby power at the remaining pumping stations is not provided; therefore, power failure would be expected to result in sewage overflows to Puget Sound. The occurrence and volume of such overflows have not been determined. However, due to the shallow depths of the overflow pipes into Puget Sound, contamination of the shoreline when overflow occurs is expected.

## Wastewater Flows

Due to the variation in the amount of infiltration/inflow into the collection system, flow data collected for the three year period (1973 to 1975) indicates that the average monthly influent flow reaching the plant fluctuated between 1.0 and 2.3 mgd. Average flow over this period of time (excluding data for November and December of 1975) was 1.5 mgd. The peak daily and hourly wet weather flows recorded for that period were 4.3 and 7.6 mgd respectively. In contrast, the existing primary treatment facility is designed for an average daily dry weather flow of 3.2 mgd and peak wet weather hourly flow of 10 mgd. Under the No Action Alternative the average annual flow would increase to 2.5 mgd as the sewered population within the service area would increase to 26, 000.

# Alternatives and Impacts
## Alternative A

### Wastewater Characteristics

The annual average 5-day biochemical oxygen demand (BOD) of effluent wastewater to the plant during the 3-year period (1973 to 1975) was 175 mg/l. This gives a monthly flow weighted BOD loading of approximately 2,000 pounds per day. The highest recorded monthly concentration was 298 mg/l in September 1975; a loading of 2,560 lbs/day. The variability of the BOD loading data through the year generally indicates little correlation to season; however, high flows usually result in low BOD concentration due to dilution.

The mean suspended solids concentration of influent wastewater over the three year period 1973 to 1975, is 193 mg/l. The monthly flow weighted suspended solids loadings during that period were 2,300 lbs/day. A peak monthly concentration of 285 mg/l was recorded in October 1974. The suspended solids concentrations do not show characteristic seasonal variation; however, they vary adversely with flow because of the effects of dilution.

Based on the BOD and suspended solids characteristics of the wastewater influent to the Richmond Beach treatment plant the flow is classified as medium strength sewage.

Adequate records for metals concentrations in the Richmond Beach influent flows are not available. However, data were recently made available on metal concentrations in composite samples of plant effluent collected on October 29, 1975. The concentration in mg/l is shown below:

| Cd | Cr | Cu | Hg | Ni | Pb | Zn |
|---|---|---|---|---|---|---|
| 0.004 | 0.01 | 0.13 | 0.0004 | 0.02 | 0.06 | 0.14 |

Data on nitrogen and phosphorus concentrations in the Richmond Beach influent and effluent are not available; however, concentrations in the influent are expected to be within concentration range typical of medium strength domestic sewage. Similarly, concentrations of nutrients in the effluent are expected to be typical of those in primary treated effluent.

### Richmond Beach Treatment Plant and Outfall

The Richmond Beach treatment plant is located on a 3.75 acre site owned by Metro. A right-of-way borders the site to the west; the eastern edge is bordered by Richmond Beach

Drive; the area to the north is in private ownership. Existing structures shown in Figure 3-3 include the round digester tanks, sedimentation tanks, and the operations building to the west.

Wastewater entering the plant is prechlorinated by one 150 pound per day chlorinator in the main control building. Following prechlorination, influent passes through a coarse grit chamber, where heavy particles present in the flow are trapped. The contents of the chamber are removed routinely on a bi-monthly basis (or following a heavy storm) and are hauled to a landfill for disposal. From the coarse grit chamber, plant influent flows through a single communitor located immediately downstream of the unit where rags and similar materials are removed. After passing through the comminutor, influent flow enters the preaeration-fine grit removal tank. Fine grit stored in the dumpster is hauled away to a land disposal site on an "as necessary" basis.

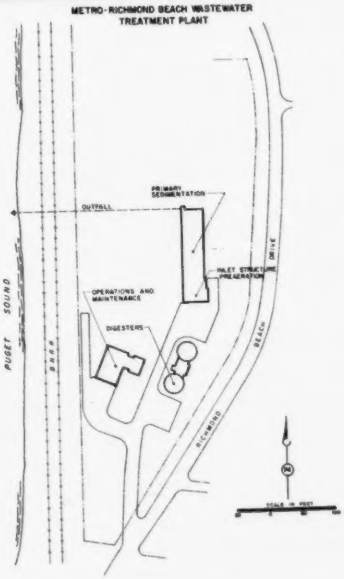
Wastewater from the preaeration tanks flows into two primary sedimentation tanks. Raw sludge that settles in the tanks is drawn by sludge collectors to sludge pump suction pumps located at the inlet end of each tank. From the sedimentation tanks, raw sludge is pumped to a primary digester on a timed schedule. Floating material in each primary sedimentation tank is skimmed, then pumped to the primary digester.

Primary effluent leaves the primary sedimentation tanks and discharges into troughs that feed into a collection chamber; the flow then passes to a chlorine contact channel. Chlorine solution is diffused into the flow at the head of the contact channel; one 250 pound per day chlorinator supplies the necessary chlorine. The rate of application of chlorine solution to the chlorine contact channel is controlled manually and calculated on a daily basis.From the channel, effluent then flows through a submarine outfall and diffuser system to Puget Sound.

The Richmond Beach outfall is 30 inches in diameter, extends 1570 feet offshore,and terminates in a 50-foot diffuser section. Wastewater is discharged horizontally approximately 2 feet above the bottom through the diffuser section at approximately 106 feet.

## Adequacy and Reliability of the Richmond Beach Treatment Plant

The existing treatment plant is adequate to handle the present and projected dry weather base wastewater flows gener-


METRO-RICHMOND BEACH WASTEWATER TREATMENT PLANT
PRIMARY SEDIMENTATION
OUTFALL
INLET STRUCTURE PREAERATION
OPERATIONS AND MAINTENANCE
DIGESTERS
PUGET SOUND
BNRR
RICHMOND BEACH DRIVE
N
SCALE IN FEET

PRIMARY TREATMENT
(EXISTING FACILITY)

Figure 3-3

Richmond Beach Layout — — Alternative A

ated from the service area. However, since the primary sedimentation tanks are sized according to the average dry weather flow of 3.2 mgd (base plus infiltration), high wet weather flows result in reduction of the plant's BOD and suspended solids removal efficiencies.

For the period 1972 through 1974 the Richmond Beach treatment plant has been reported to remove 32 to 47 percent of BOD loadings in the influent wastewater. Similarly, suspended solids are reduced 62 to 84 percent. The removal figures reported are in line with those expected from primary treatment. Such treatment generally removes between 25 to 40 percent of BOD and 50 to 65 percent of the suspended solids in the wastewater.

The plant discharge under dry weather conditions is in compliance with the effluent limitations of the present NPDES permit. Although the BOD and suspended solids concentrations in the effluent may exceed the allowable monthly average concentrations at times, the total pounds per day of BOD and suspended solids discharged are within those allowed by the permit because the present flows (average 1.5 mgd) are lower than the 3.2 mgd flow used in the permit.

Adequate disinfection of the effluent cannot be attained under the present conditions. Fecal coliform counts in the water violate commercial shellfishing standards near the shoreline in the vicinity of the plant and the outfall plume. Chlorine feeding is controlled manually and calculated on a daily basis. Because the chlorine injection rate cannot respond to hourly fluctuations in flow, a low-dosage rate could result in inadequate disinfection of the effluent, while a high dosage rate could result in unnecessarily high chlorine residual. A chlorine contact tank is not provided. The chlorine contact time is entirely accomplished in the submarine outfall; therefore; therefore, accurate monitoring of the chlorine residual is not feasible.

The plant is provided with means for complete bypass of the plant during emergency conditions, authorized by the NPDES permit during severe weather. Since the flow through the plant is by gravity and standby power for the major equipment can be provided in a short period of time, the occurrence of such bypassing is rare.

Since the plant provides primary treatment only, the unit operations involved are rather simple to control and operate and can be considered reliable. Adequate surveillance is also provided. The plant is manned seven days a week, eight hours a day. When unmanned, critical processes at the plant are monitored at the West Point main control center.

# Alternatives and Impacts
## Alternative A

### Sludge Characteristics and Management

The Richmond Beach sewage treatment plant has on-site sludge anaerobic digestion facilities, but not sludge dewatering equipment. Currently, digested sludge is hauled from Richmond Beach to the Interbay pumping station for transmission by sewer to West Point where it passes through the entire treatment process. West Point digested and dewatered sludge is trucked to a selected land disposal site.

The digestion facility at Richmond Beach is adequate to meet present needs. It consists of two digesters with provisions for both mixing and heating the sludge. The raw sludge pumped from the primary sedimentation tanks is mixed with heated recirculated digested sludge and fed to the digesters. Sludge gas produced in the digestion process is recovered for heating the boiler which supplies hot water for the heat exchangers used to heat the sludge.

The solids content of the digested sludge at Richmond Beach has fluctuated between 1.8 and 8.8 percent with a mean monthly average of 5.5 percent. The solids concentration also varies with season. Wet weather produces sludges with over twice the solids concentrations of those found during the dry periods.

On the average, sludge from the Richmond Beach treatment plant amounted to approximately 0.4 tons of dry solids a day in 1975, which requires about one sludge truck trip per day. Sludge from Richmond Beach and Carkeek Park treatment plants is usually collected on the same day to maximize truck loadings and minimize hauling and is trucked to Cedar Hills and Pack Forest for recycling.

## Impacts

This analysis includes primary impacts only. Secondary impacts are considered in the Regional EIS.

### Geology, Soils and Topography

Because the No Action Alternative would involve no construction of new facilities, there would be no impacts related to geology and soils other than a small continued risk of earthquake damage from seismic activity.

## Air Quality and Odors

Continued operation of the Richmond Beach plant should have no impact on local atmospheric conditions or air quality. Few citizen complaints regarding odors at Richmond Beach have been made to date, and there is no reason to expect change because the site is effectively isolated from nearby residences and the plant is operated in a responsible manner. Aerosols and pathogens are not judged to be a problem at Richmond Beach. The impact of particulates or other air quality contaminants from less than one sludge truck trip per day should be insignificant.

## Water Quality

Under the No Action Alternative the discharge of suspended solids, nutrients, heavy metals and pathogens from the Richmond Beach facility into Puget Sound would increase about 50% over 1975 levels with increases in population growth. These increases are judged to have adverse, minor, limited but long-term impacts on nearshore and offshore water quality. Increased discharge of nutrients could have a minor, limited, long-term, adverse impact on offshore phytoplankton. Because Richmond Beach has edible shellfish, the microbiological quality of nearshore waters is of concern. Fecal coliform counts already exceed state commercial shellfish water quality standards; any further increase in discharges could have a minor-to-moderate adverse effect on the microbiological quality of nearshore waters which would probably be limited in extent and reversible, but long-term.

Because industries contribute only an insignificant flow to the Richmond Beach plant, one would not expect heavy metals and other toxicants (except perhaps chlorine) to be a serious problem. However, based on scanty data, concentrations of copper, zinc, and mercury in the Richmond Beach effluent appear to exceed marine water quality standards proposed by the EPA in 1975 (see Regional Analysis). The cadimum concentration is very close to the EPA limit. With a 100:1 dilution at the diffuser, the metals concentrations in the receiving waters would be considered "safe". The source(s) of metals has not been identified. The major industries contributing to the Richmond Beach treatment plant are the Chevron Asphalt and Standard Oil Companies which operate oil related processing facilities at their Point Wells site. The industries operate a joint industrial waste treatment facility which directly discharges to Puget Sound. However, the sanitary sewerage from both plants and phenolated water from the Chevron Asphalt distillation unit have been discharged to the municipal treatment facility. The flow is approximately 0.01 mgd which is insignificant compared to the total flow reaching the facility. The quantities of metals in the wastewater are within those allowable by Metro for a simple discharge.

Increased discharges of metals with increased flows would have minor, limited, long-term and irreversible adverse impacts on offshore and nearshore waters. Toxicity of chlorine residuals due to high chlorine dosages in the effluent could have minor, limited, long-term adverse effects on nearshore and offshore waters. Toxic effects have not been examined in the field.

The existing plant handles present (1975) flows from the service area. As primary sedimentation tanks are sized for 3.5 mgd, high wet weather flows of up to 7.6 mgd result in some reduction of the plant's BOD and suspended solids removal efficiencies.

Pump station overflows would occur in wet weather at pump station No. 4 in the Ronald sewer district and at the Richmond Beach pumping station. The occurrence and volume of such overflows have not been determined.

Groundwater is not a concern at Richmond Beach.

## Biology

Terrestrial biology. Because Alternative A does not alter the Richmond Beach plant in any way, the vegetation and habitat to the north and east of the plant would remain unchanged. Thus, there would be no impact on the terrestrial biology.

Puget Sound biology. The Puget Sound intertidal would likely continue to be exposed to effluent coming ashore at certain portions of the tidal cycle. Effects of this low-level exposure are difficult to separate from natural variations in abundance and diversity of biota connected with substrate type and so remain unknown. Affects would probably be minor at most,however, due to the small effluent flow volume.

Mercury and lead were measured in representative intertidal plants and animals at Richmond Beach (Schell *et al.*, 1977). Plants (green and brown algae) tended to accumulate more lead than mercury, to levels the same as or slightly lower than those found at West Point and Carkeek. Mussels and clams accumulated more mercury than did plants. Levels of both metals were about the same as at Carkeek and West Point. In all organisms sampled, metals levels were generally higher than at background stations. Levels of mercury and lead in shellfish are within allowable limits. Standards for other metals have not been set.

Fecal coliforms would probably continue to exceed state standards for shellfish waters. Toxicants levels have not been measured in Richmond Beach effluent, so future effects cannot be determined.

Potential effects on benthic biota could increase with increased flows but would probably continue to be very minor. Free-swimming organisms are probably attracted to the outfall pipe, the life attached to it and the plume. Whether or not negative effects occur on fish is unknown, but the effects are considered to be minor. Certain metals in effluent exceed EPA criteria for marine life, but would be at safe levels with 100:1 dilution at the diffuser.

Effects on offshore life are unknown but expected to be negligible.

Pump station overflows could continue to have minor adverse impacts of limited extent on beach areas, which would be, except for metals and toxicants, reversible.

## Natural Resources and Energy

Natural resources and energy impacts are not analyzed on a site-specific basis. Rather, these considerations are analyzed in the Regional EIS on an interrelated basis between the five existing Metro plants and potential new sites.

## The Human Environment

Many of the human environment facets pertinent to the Richmond Beach site are discussed and evaluated only in the Regional EIS. Topics described in this volume include: land use, legal and institutional: agency and neighborhood goals; social, recreational, and cultural; archeological and historical; health and safety; and aesthetics and nuisance.

## Alternatives and Impacts
## Alternative A

Land use. Under Alternative A, the Richmond Beach facility would not be changed. The impact would still be adverse, minor, long-term, reversible, local and definite.

Legal and institutional. Many of the legal issues are developed in the Regional EIS. This alternative would not fulfill the requirements of PL 92-500.

Agency and neighborhood goals. The presence of the Richmond Beach facility does not conflict with the goals of residents of the Richmond Beach area.

With adequate landscaping, the implementation of this alternative would not conflict with the goal of PSCOG that "natural amenities identified as important to the region's character and beauty shall be preserved or sensitively developed as a second choice."

This alternative does not meet the goal of the PSCOG that "achievement of water quality standards as established by law is recognized and supported." To meet this goal, secondary treatment would be required.

Employment and costs. Employment and cost considerations are developed in the Regional EIS.

Social, recreational, and cultural. Society and culture are not affected by the Richmond Beach facility. Recreational usage of the beach would continue to be impaired only to the extent that those who use this beach must walk around the facility. This impact is considered adverse, minor, long-term, reversible, local, and definite.

Archeological and historical. No known archeological or registered historical sites would be affected by this alternative; as there is no construction.

Health and safety. There may continue to be health risks associated with the consumption of shellfish because of continued primary effluent discharge, as is discussed in the biological section of the EIS.

An unlikely safety hazard is accidental leakage of chemicals when they are in transport, or handled on site. Although nearly every U.S. water and wastewater treatment facility uses chemicals, there have been very few chemical-related accidents.

The health and safety problems related to sludge transport and disposal would be as improbable as for any other trucks in transit.

Construction safety risk would be as for any other similar construction: with safety conscious procedures there should be a limited chance of accidents.

Aesthetics and nuisance. Because the Richmond Beach facility would continue to be located below an embankment, would be surrounded by vegetation, and have a low profile, it would not readily be visible from many angles; views toward Puget Sound from homes on the hills above the site would be unobstructed by the site. Odor would continue to be slight; noise would be at ambient levels.

The aesthetic nuisance of the facility would be in part neutralized by the presence of the Point Wells industrial complex just north of the facility.

Aesthetic impacts are considered adverse, minor, long-term, reversible, local, and probable.

Under this alternative, there would be 0.8 sludge trucks per day leaving the Richmond Beach facility. These would travel on roads which are extensively used by industrial traffic, and therefore would not be noticed. This impact is insignificant.

## Mitigation Measures

Because of the "No Action" definition of Alternative A, no mitigation measures can be proposed.

## Unavoidable Adverse Impacts

All adverse impacts under Alternative A would be unavoidable. These would include impacts on water quality from CSO discharge, related impacts on public health and fish, continued use of plant sites in parks or residential areas, and noncompliance with PL 92-500.

## ALTERNATIVE B
## METRO COMPREHENSIVE PLAN (NO ACTION PURSUANT TO PL 92-500)

### General Description

In this alternative, the policies and programs of the regional comprehensive plan conceived prior to the enactment of PL 92-500 would be implemented.

This alternative for Richmond Beach is discussed in terms of service area, treatment plant, and sludge management. Except for miscellaneous improvements, Alternative B would be the same as Alternative A for Richmond Beach.

### Service Area and Collection System

The Richmond Beach service area would not be changed relative to Alternative A. However, the sewered population within the service area would increase to 26,000 by 2005, an increase of 9000 over existing conditions. The population growth would generate a base wastewater load of 2.5 mgd; peaks up to 9 mgd in storm conditions would continue.

The Richmond Beach service area is expected to remain primarily residential. Commercial activities will expand to keep pace with the population growth. Sewered population projections for the year 1985 would be 19,000, according to PSCOG intermediate projections.

Future dry and wet weather flows projected for the service area would be within the capacity of both the local agencies and Metro transmission systems. Additional interceptors or pumping stations would not be required. The increase in the sewered population tributary to the system will result from the filling in of partially occupied sewered areas. Additional sewering would be limited mainly to service laterals.

Since the design capacity of the existing treatment plant is in excess of the peak wet weather flow of 9.0 mgd projected for the year 2005, attempts to reduce the infiltration inflow quantities would not be economical.

In addition to the present service area, potential contributors to the Richmond Beach Treatment Plant within the natural drainage area include the snohomish County areas of Woodway and a portion of Edmonds bordering the King/Snohomish

County line. Woodway is presently unsewered and intends to remain so for the foreseeable future; it is unlikely that the institutional problems related to serving the small area of Edmonds would be overcome. Consequently, for this analysis it was assumed Richmond Beach service will be limited to the existing tributary area at least through the year 2005.

### Treatment Plant and Effluent Discharge

The wastewater generated in the service area would continue to receive primary treatment only, with disposal of the effluent to Puget Sound. Flows for 2005 would be 2.5 mgd average, 9 mgd peak. The plant site would appear as in Alternative A (Figure 3-3).

Miscellaneous improvements would be made to the plant. Purchase of a $100,000 chlorine leak detector is included in the Draft Facility Plan.

### Sludge

As in Alternative A, primary sludge would receive anaerobic treatment at Richmond Beach. It would then be trucked to the Interbay pumping station for transfer to West Point. The sludge digestion facility is adequate to handle the additional sludge quantities due to population increases and higher loadings.

## Impacts

This analysis includes primary impacts only. Secondary impacts are considered in the Regional EIS.

### Geology, Soils and Topography

Because the Comprehensive Plan Alternative would involve no construction of new facilities at Richmond Beach, there would be no plant site impacts related to geology and soils other than a small continued risk of earthquake damage from siesmic activity. Possible impacts of decentralized sludge management option are undetermined since details are not yet available. The installation of a chlorine leak detector is not expected to affect earth resources.

## Air Quality and Odors

Continued operation of the Richmond Beach plant should have no impact on local atmospheric conditions or air quality. Few citizen complaints regarding odors at Richmond Beach have been made to date, and there is no reason to expect change because the site is effectively isolated from nearby residences and the plant is operated in a responsible manner. Aerosols and pathogens are not judged to be a problem at Richmond Beach. The impact on particulates or other air quality contaminants from less than one sludge truck trip per day should be insignificant.

## Water Quality

Under the Metro Comprehensive Plan Alternative the discharge of suspended solids, nutrients, and heavy metals and pathogens from the Richmond Beach facility into Puget Sound would increase about 50% over 1975 levels with increases in population growth. These increases are judged to have adverse, minor, limited but long-term impacts on nearshore and offshore water quality. Increased discharge of nutrients could have a minor, limited, long-term, adverse impact on offshore phytoplankton.

Because Richmond Beach has edible shellfish, the microbiological quality of nearshore waters is of concern. Fecal coliform counts already exceed state commercial shellfish water quality standards; any further increase in discharges could have a minor-to-moderate adverse effect on the microbiological quality of nearshore waters which would probably be limited in extent and reversible, but long-term. Because industries contribute only an insignificant flow to the Richmond Beach plant, one would not expect heavy metals and other toxicants (except perhaps chlorine) to be a serious problem; however, based on scanty data, concentrations of copper, zinc, and mercury in the Richmond Beach effluent appear to exceed marine water quality standards proposed by the EPA in 1975 (see Regional Analysis). The cadmium concentration is very close to the EPA limit. With a 100:1 dilution at the diffuser, the metals concentration in the receiving waters would be considered "safe". The source(s) of metals has not been identified. The major industries contributing to the Richmond Beach treatment plant are the Chevron Asphalt and Standard Oil Companies which operate oil related processing facilities at their Point Wells site. The industries operate a joint industrial waste treatment facility which directly discharges to Puget Sound. However, the sanitary sewerage from both plants and phenolated water from the Chevron Asphalt distillation unit have been discharged to the municipal treatment facility. The flow is approximately 0.01 mgd which is insignificant compared to the total flow reaching the facility. The quantities of metals in the wastewater are within those allowable by Metro for a simple discharger. Increased discharges of metals with increased flows would have minor, limited, long-term, and irreversible adverse impacts on offshore and nearshore waters. Toxicity of chlorine residuals due to high chlorine dosages in the effluent could have minor, limited, long-term adverse effects on nearshore and offshore waters. Toxic effects have not been examined in the field.

The existing plant handles present (1975) flows from the service area. As primary sedimentation tanks are sized for 3.2 mgd, high wet weather flows of up to 7.6 mgd result in some reduction of the plant's suspended solids and BOD removal efficiencies.

Pump station overflows occur in wet weather at pump station No. 4 in the Ronald Sewer district and at the Richmond Beach pump station. The occurrence and volumes of such overflows have not been determined.

Groundwater is not a concern at Richmond Beach.

## Biology

Terrestrial biology. Because Alternative B alters the Richmond Beach plant only in installing a chlorine leak detector, the vegetation and habitat to the north and east of the plant would remain unchanged. Thus, there would be no impact on the terrestrial biology.

Puget Sound biology. The Puget Sound intertidal would likely continue to be exposed to effluent coming ashore at certain portions of the tidal cycle. Effects of this low-level exposure are difficult to separate from natural variations in abundance and diversity of biota connected with substrate type and so remain unknown. Effects would probably be minor at most however, due to the small effluent flow volume.

Mercury and lead were measured in representative intertidal plants and animals at Richmond Beach (Schell et al., 1977). Plants (green and brown algae) tended to accumulate more lead than mercury, to levels the same as or slightly lower than those found at West Point and Carkeek. Mussels and clams accumulated more mercury than did plants. Levels of both metals were about the same as at Carkeek and West Point. In all organisms sampled, metals levels were generally higher than at background stations, but within allowable limits. The impact on the organisms is unknown.

Fecal coliforms would probably continue to exceed state standards for shellfish waters. Toxicants levels have not been measured in Richmond Beach effluent, so future effects cannot be determined.

Potential effects on benthic biota could increase with increased flows but would probably continue to be very minor. Free-swimming organisms are probably attracted to the outfall pipe, the life attached to it and to the plume. Whether or not negative effects occur on fish is unknown, but the effects are considered to be minor. Certain metals in effluent exceed EPA criteria for marine life, but would be at safe levels with 100:1 dilution at the diffuser.

Effects on offshore life are unknown but expected to be negligible.

Pump station overflows are assumed to continue minor, limited adverse impacts on beach areas. These impacts would be, except for metals and toxicants, reversible.

## Natural Resources and Energy

Natural resources and energy impacts are not analyzed on a site-specific basis. Rather, these considerations are analyzed in the Regional EIS on an interrelated basis between the five existing Metro plants and potential new sites.

## The Human Environment

Many of the human environment facets pertinent to the Richmond Beach site are discussed and evaluated only in the Regional EIS. Topics described in this volume include: land use; legal and institutional; agency and neighborhood goals; social, recreational, and cultural; archeological and historical; health and safety; and aesthetics and nuisance.

Land use. Under Alternative B, the Richmond Beach facility would not be changed. The impact would still be adverse, minor, long-term, reversible, local, and definite.

Legal and institutional. Many of the legal issues are developed in the Regional EIS. This alternative would not fulfill the requirements of PL 92-500.

Agency and neighborhood goals. The presence of the Richmond Beach facility does not conflict with the goals of residents of the Richmond Beach area.

With adequate landscaping, the implementation of this alternative would not conflict with the goal of PSCOG that "natural amenities identified as important to the region's character and beauty shall be preserved or sensitively developed as a second choice."

This alternative does not meet the goal of the PSCOG that "achievement of water quality standards as established by law is recognized and supported." To meet this goal, secondary treatment would be required.

Employment and costs. Employment and cost considerations are developed in the Regional EIS.

Social, recreational, and cultural. Society and culture are not affected by the Richmond Beach facility. Recreational usage of the beach would continue to be impaired only to the extent that those who use this beach must walk around the facility. This impact is considered adverse, minor, long-term, reversible, local and definite.

Archeological and historical. No known archeological or registered historical sites would be affected by this alternative as there is no construction.

Health and safety. There may continue to be health risks associated with the consumption of shellfish because of continued primary effluent discharge, as is discussed in the biological section of the EIS.

An unlikely safety hazard is accidental leakage of chemicals when they are in transport, or handled on site. Although nearly every U. S. water and wastewater treatment facility uses chemicals, there have been very few chemical-related accidents.

The health and safety problems related to sludge transport and disposal would be as improbable as for any other trucks in transit.

Construction safety risk would be as for any other similar construction: with safety conscious procedures there should be a limited chance of accidents.

Aesthetics and nuisance. Because the Richmond Beach facility would continue to be located below an embankment, would be surrounded by vegetation, and have a low profile, it would not readily be visible from many angles; views toward Puget Sound from homes on the hills above the site would be unobstructed by the plant. Odor would continue to be slight; noise would be at ambient levels.

The aesthetic nuisance of the facility would be in part neutralized by the presence of the Point Wells industrial complex just north of the facility.

Aesthetic impacts are considered adverse, minor, long-term, reversible, local, and probable.

Under this alternative, there would be 0.8 sludge trucks per day leaving the Richmond Beach facility. These would travel on roads which are extensively used by industrial traffic, and therefore would not be noticed. This impact is insignificant.

## Mitigation Measures

Several mitigation measures are suggested to aid in the reduction of adverse impacts resulting from the implementation of this alternative.

An improved chlorine feed system can be designed to prevent chlorine residuals in the sewage treatment plant effluent from exceeding dangerous levels. This could be achieved by matching chlorine levels to effluent discharge, and/or installing a chlorine contact tank, which would maximize the efficiency of chlorination treatment. Currently, chlorine is injected into the effluent flow at a constant rate set manually on a daily basis, regardless of wastewater flow through the treatment facilities. This causes a fluctuating chlorine residual which, if high (overchlorination) can have toxic effects on biota, and if low (underchlorination) can possibly have public health impacts.

Pump station overflows occur at Pump Station No. 4 in the Ronald sewer district and at the Richmond Beach pump staton, with discharge ultimately to Puget Sound. With the installation of the standby generator at Hidden Lake pump station, overflows at Station No. 4 will be reduced. Standby power at the remaining pump stations is not provided; therefore, power failures would be expected to result in sewage overflows to the Sound. Due to the shallow depths of the overflow pipes into the Sound, contamination of the shoreline when overflow occurs is inevitable. Provision of a backup power system for these pumping stations would mitigate the occurrence of overflows and thus of contamination of adjacent shorelines.

## Unavoidable Adverse Impacts

Under this alternative, the following adverse impacts would be unavoidable.

Sludge trucking. There will necessarily be some trucking of sludge from Richmond Beach to the Interbay pumping station.

Pump station overflows. This alternative does not take adequate measures to control overflows; they will still occur in wet weather.

Primary effluent effect on water quality and biota. This alternative does not implement secondary treatment; the minor water degradation of Puget Sound would continue as would effects on biota.

Non-compliance with PL 92-500. Public Law 92-500 requires the installation of secondary treatment. This alternative does not comply.

Aesthetic nuisance of plant location. Wastewater treatment facilities are a nuisance in all alternatives; the question is: how can these nuisances be made smallest?

O & M and capital costs. Construction of wastewater facilities, interceptors, and CSO holding tanks is expensive. The facilities must be operated and maintained.

Energy expenditures. Energy can in part be provided by the methane produced in anaerobic digestion, but there is still a large expenditure of energy which cannot be mitigated.

## ALTERNATIVES C AND D

### General Description

On the regional level, Alternatives C ( Major Combined Sewer Overflow Control) and D (Partial Combined Sewer Overflow Control) would differ in their ability to control overflows from combined sewers. However, at Richmond Beach, they would be equivalent in upgrading the plant to enhanced primary.

The combined sewer overflow abatement programs under these two alternatives would not affect the Richmond Beach service area since the majority of the area is served by a separate collection system and overflows are infrequent. No modifications in the service area are planned.

The wastewater treatment process would be upgraded to include chemical feed during the summer to enhance the BOD and suspended solids removal efficiencies for 2.5 mgd average, 9 mgd peak flows. Chemical feeding and storage facilities would be provided on the present site as shown in Figure 3-4. Construction cost is estimated to be $1.1 million. Treated effluent would be discharged to Puget Sound through the existing outfall.

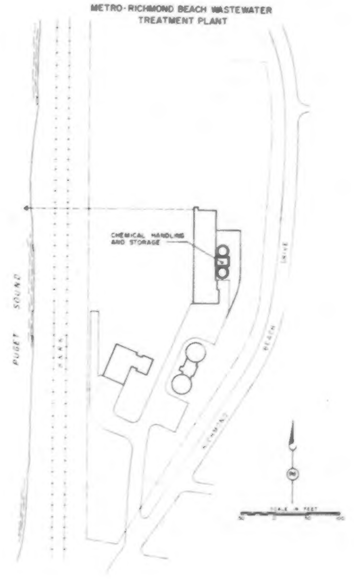
No new sludge management facilities would be built under Alternatives C and D. Sludge would be digested anaerobically at the plant, then trucked to the Interbay pumping station for transfer to West Point. Because additional solids would be removed by enhanced primary, sludge truck trips would increase from 0.8 per day (Alternative B) to 1.3 per day in Alternatives C and D.

### Impacts

This analysis includes primary impacts only. Secondary impacts are considered in the Regional EIS.

#### Geology, Soils and Topography

The impacts of minimal upgrading to enhanced primary treatment at Richmond Beach, including treatment of digester sidestreams and enhanced solids removal in summer, would involve addition of chemical handling and storage equipment on already prepared land as the only physical change on site.


METRO-RICHMOND BEACH WASTEWATER TREATMENT PLANT
CHEMICAL HANDLING AND STORAGE
PUGET SOUND
PARK
RICHMOND BEACH DRIVE
N
SCALE IN FEET
50
0
50
100

ENHANCED PRIMARY TREATMENT

Figure 3-4

Richmond Beach Layout — — Alternatives C and D

No alterations to soil, topography and other related items are expected. As at the existing plant, the site would be subject to continued risk from seismic activity. Impacts of a sub-option for decentralized sludge management under Alternatives C and D are undetermined since process details are not available.

## Air Quality and Odors

The enhanced primary treatment process is not expected to cause odor problems at the site, which does not experience odor problems with current primary treatment. During construction of the chemical storage and handling facilities, no air quality related impacts are expected. Although the additional sludge from enhanced primary treatment would increase the number of sludge truck trips to 1.3 per day, this traffic would produce no measurable change in air quality.

## Water Quality

Because the Richmond Beach collection system is already separated, Alternatives C and D, which aim to control CSOs on a regional basis, will have little effect on water quality at Richmond Beach. The plant will be upgraded to enhanced primary treatment, improving suspended solids and BOD removal efficiencies. BOD and solids loads will be 22% below baseline (Alternative B) levels. Nutrient loads would be at baseline levels; metals and toxicants would be slightly-to-moderately reduced.

The plant discharge under 1975 dry weather conditions is in compliance with the effluent limitations of the present NPDES permit. Although the BOD and suspended solids concentrations in the effluent may exceed the allowable monthly average concentrations at times, the total pounds per day of BOD and suspended solids discharged are within those allowed by the permit because the present flows (average 1.6 mgd) are lower than the base flow used in the permit of 3.2 mgd. When base flow becomes 3.5 mgd, the BOD and solids loads could exceed permit limits in wet weather, when flows are higher and alum would not be added.

Enhanced primary effluent requires about one-third less chlorine to achieve the same bacterial removal as in primary effluent. With a manually controlled chlorine feed rate and a proposed decrease in chlorine use of 12% (Metropolitan Engineers, 1977), either effluent may be underchlorinated in

B and properly chlorinated in C and D, or effluent is properly chlorinated in B and would be overchlorinated in C and D. The fluctuating residuals in either case could have limited toxic effects on biota and/or maintain fecal coliform levels in nearshore waters that exceed shellfish standards.

## Biology

Terrestrial biology. The chemicals handling and storage buildings supplied under alternatives C and D would be built on the grass just west of the present facility. The reduction in grassland habitat is considered to be negligible. There would be no impact on the shrubbery and trees to the north and east of the plant. The total effect is judged to be negligible.

Puget Sound biology. Under alternatives C and D, treatment will be advanced primary in summer due to alum addition. Disinfection may or may not be improved somewhat due to reduced chlorine demand with solids removal. Annual BOD and solids loads would be reduced about 22%. Wet weather flows could be higher in BOD and solids than summer as plant capacity could be exceeded.

Effluent is assumed to continue to impact the intertidal, but to an unknown but probably minor extent. Metals levels in intertidal biota would probably be maintained. Although the sources of the metals have not been identified, it is assumed that the effluent is one, and since metals removals would be 22% greater than that in A and B, the overall change in levels in biota is expected to be essentially the same.

Fecal coliform levels in waters could continue to exceed state shellfish standards, so that consumption of shellfish from the beach could pose a health risk. Occasional high chlorine residuals could have short-term effects of unknown magnitude on organisms near the effluent plume.

A 22% decrease in BOD and solids would have a minor beneficial impact on benthic and free-swimming organisms in the effluent plume area assuming a minor impact occurs under baseline conditions.

## Natural Resources and Energy

Natural resources and energy impacts are not analyzed on a site-specific basis. Rather, these considerations are analyzed in the Regional EIS on an interrelated basis between the five existing Metro plants and potential new sites.

## The Human Environment

Many of the human environment facets pertinent to the Richmond Beach site are discussed and evaluated only in the Regional EIS. Topics described in this volume include: land use; legal and institutional; agency and neighborhood goals; social, recreational, and cultural; archeological and historical; health and safety; and aesthetics and nuisance.

Land use. Under Alternatives C and D, enhanced primary treatment would be added to the Richmond Beach facility. This addition would occur within the present built-up area, so there is expected to be little new impact on land use; the impact would still be adverse, minor, long-term, reversible, local, and definite. A permit from the King County Shorelines Management Master Program would be required because this expansion would take place within 200 feet of shore.

Legal and institutional. Many of the legal issues are developed in the Regional EIS. These alternatives would not fulfill the requirements of PL 92-500.

Agency and neighborhood goals. The slight addition to the Richmond Beach facility does not conflict with the goals of residents of the Richmond Beach area.

With adequate landscaping, the implementation of these alternatives would not conflict with the goal of PSCOG that "natural amenities identified as important to the region's character and beauty shall be preserved or sensitively developed as a second choice."

Employment and costs. Employment and cost considerations are developed in the Regional EIS.

Social, recreational, and cultural. Society and culture are not affected by the Richmond Beach facility. Recreational usage of the beach would continue to be impaired only to the extent that those who use this beach must walk around the facility. This impact is considered adverse, minor, long-term, reversible, local, and definite.

Archeological and historical. No known archeological or registered historical sites would be affected by these alternatives; the additions to the facility would occur in areas which have already been disturbed; so it is not likely that any archeological specimens would still be present.

Health and safety. There may continue to be health risks associated with the consumption of shellfish because of continued primary effluent discharge, as is discussed in the biological section of the EIS.

An unlikely safety hazard is accidental leakage of chemicals when they are in transport, or handled on site. Although nearly every U. S. water and wastewater treatment facility uses chemicals, there have been very few chemical-related accidents.

The health and safety problems related to sludge transport and disposal would be as improbable as for any other trucks in transit.

Construction safety risk would be as for any other similar construction: with safety conscious procedures there should be a limited chance of accidents.

Aesthetics and nuisance. Because the Richmond Beach facility would continue to be located below an embankment, would be surrounded by vegetation and have a low profile, it would not readily be visible from many angles; views toward Puget Sound from homes on the hills above the site would be unobstructed by the plant. Odor would continue to be slight; noise would be at ambient levels. The additional chemical storage tanks installed under these alternatives would be placed close to the embankment, where they would be least visible from above.

The aesthetic nuisance of the facility would be in part neutralized by the presence of the Point Wells industrial complex just north of the facility.

Aesthetic impacts are considered adverse, minor, long-term, reversible, local, and probable.

Under these alternatives, there would be 1.3 sludge trucks per day leaving the Richmond Beach facility. These would travel on roads which are extensively used by industrial traffic, and therefore would not be noticed. This impact is insignificant.

## Mitigation Measures

Several mitigation measures are suggested to aid in the reduction of adverse impacts resulting from the implementation of this alternative.

An improved chlorine feed system can be designed to prevent chlorine residuals in the sewage treatment plant effluent from exceeding dangerous levels. This could be achieved by matching chlorine levels to effluent discharge, and/or installing a chlorine contact tank, which would maximize the efficiency of chlorination treatment. Currently chlorine is injected into the effluent flow at a constant rate set manually on a daily basis, regardless of wastewater flow through the treatment facilities. This causes a fluctuating chlorine residual which, if high (overchlorination) can have toxic effects on biota, and if low (underchlorination) can possibly have public health impacts.

Pump station overflows occur at Pump Station No. 4 in the Ronald sewer district and at the Richmond Beach pump station, with discharge ultimately to Puget Sound. With the installation of the standby generator at Hidden Lake pump station, overflows at Station No. 4 will be reduced. Standby power at the remaining pump stations is not provided; therefore, power failures would be expected to result in sewage overflows to the Sound. Due to the shallow depths of the overflow pipes into the Sound, contamination of the shoreline when overflow occurs is inevitable. Provision of a backup power system into these pumping stations would mitigate the occurrence of overflows and thus of contamination of adjacent shorelines.

The wastewater facilities are fairly well situated with respect to visual impact on the surrounding neighborhood. The remaining visual nuisance of the wastewater treatment facilities could be mitigated by implementing the landscaping options which would hide the facilities.

Wastewater to Puget Sound contains metals and toxicants and pathogens year-round associated with solids. Therefore enhanced primary treatment of wet as well as dry weather flows would mean greater water quality benefits and potentially reduced effects on biota. Chlorine application could be reduced by one-third over primary effluent for the same level of disinfection with enhanced solids removals.

## Unavoidable Adverse Impacts

Under this alternative, the following adverse impacts would be unavoidable without unreasonable outlays of money.

Facilities construction. Although construction activities can be screeded from public view, they will still be a temporary nuisance.

Sludge trucking. Under these alternatives, there will necessarily be some trucking of sludge from Richmond Beach to the Interbay pumping station.

Pump station overflows. This alternative does not take adequate measures to control overflows; they will still occur in wet weather.

Primary effluent effect on water quality and biota. This alternative does not implement secondary treatment; the slight water degradation of Puget Sound would continue as would effects on biota.

Non-compliance with PL 92-500. Public Law 92-500 requires the installation of secondary treatment. This alternative does not comply.

Land use. Land is required in all alternatives; the question is: where will the impact occur?

Aesthetic nuisance of plant location. Wastewater treatment facilities are a nuisance in all alternatives; the question is: how can these nuisances be made smallest?

O & M and capital costs. Construction of wastewater facilities is expensive. The facilities must be operated and maintained.

Energy expenditures. Energy can in part be provided by the methane produced in anaerobic digestion, but there is still a large expenditure of energy which cannot be mitigated.

## ALTERNATIVES E, F AND G
## SECONDARY

### General Description

Although Alternatives E (Secondary), F (Secondary/ Southern Strategy) and G (Secondary/West Point Phaseout Option) differ on the regional level, they would be identical at Richmond Beach.

The service area under these alternatives would be as in Alternative B and the same as served by the existing treatment plant. Average dry weather flows from the 2005 sewered population of 26,000 would be 2.5 mgd.

Unlike Alternatives A, B, C and D, a partial reduction in the infiltration/inflow would be cost effective in Alternatives E, F and G. Since Richmond Beach is considered to have a separate sanitary sewer system, both dry and wet weather flows are required to receive secondary treatment and meet the 85 percent removal level for BOD and suspended solids. The partial reduction in I/I, if inplemented, would reduce the inflow into the Highland sewer district by about 1 mgd. Thus peak flows would be 8 mgd. The EPA has not yet approved the necessary I/I work, however.

Richmond Beach would provide secondary treatment by 1981, according to the Draft Facility Plan schedule. Upgrading the plant to secondary treatment would involve adding aeration basins, secondary clarifiers and additional handling facilities, shown in Figure 3-5. Chlorine contact tank and dechlorination facilities shown are also included in the Plan. The plant would occupy 4.2 acres, rather than the present 2.4 acres, but could be expanded at the existing Metro Site and would not require shoreline fill. Treated wastewater would be discharged to Puget Sound through the existing outfall.

Due to the provision of secondary treatment which results in improved removals of BOD and suspended solids, sludge quantities would be larger; additional sludge handling facilities would be required as shown in Figure 3-5. The proposed sludge facility includes an additional digester and appurtenant equipment, and thickening equipment for the waste activated sludge prior to digestion. The digested sludge would be trucked to Interbay pumping station as practiced at present.

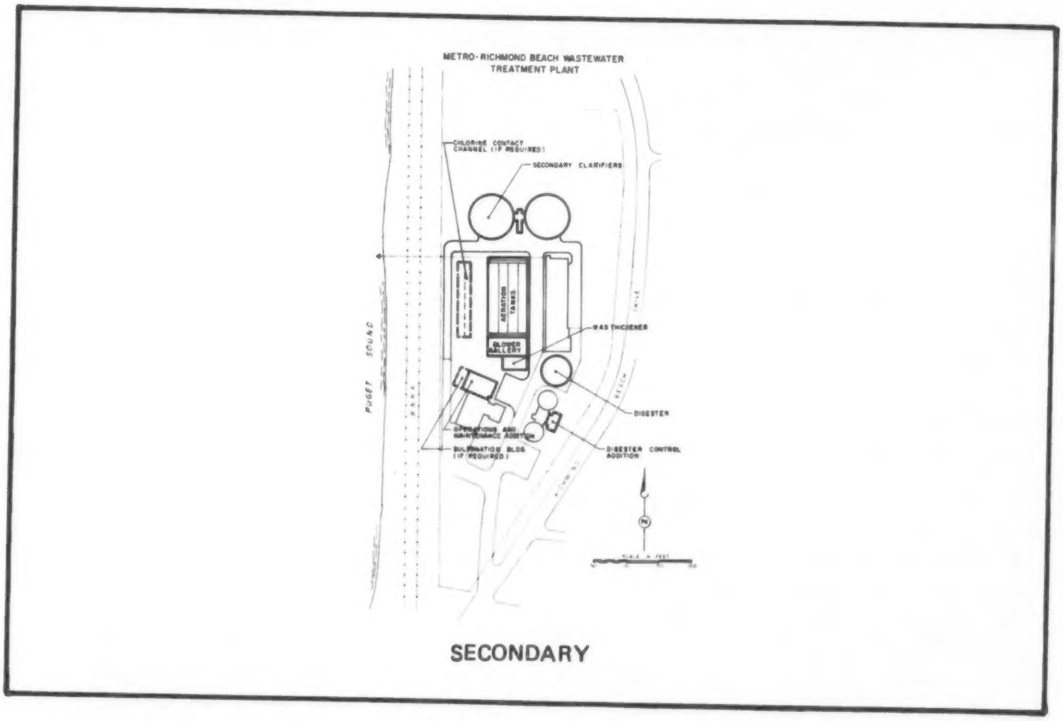

METRO-RICHMOND BEACH WASTEWATER TREATMENT PLANT
CHLORINE CONTACT CHANNEL (IF REQUIRED)
SECONDARY CLARIFIERS
AERATION TANKS
BLOWER GALLERY
WAS THICKENER
DIGESTER
OPERATIONS AND MAINTENANCE ADDITION
SULFONATION BLDG (IF REQUIRED)
DIGESTER CONTROL ADDITION
PUGET SOUND
BNRR
BEACH
DRIVE
N
SCALE IN FEET
SECONDARY

Figure 3-5

Richmond Beach Layout — — Alternatives E, F, and G

## Impacts

This analysis includes primary impacts only. Secondary impacts are considered in the Regional EIS.

### Geology, Soils and Topography

Secondary treatment would be provided at Richmond Beach under Alternatives E, F, and G. The area needed for treatment facilities would increase from 2.4 to 4.2 actes, which is currently available at the site with no need for shoreline fill. Constructing aeration tanks, secondary clarifiers, a waste activated sludge thickener and chlorination and dechlorination facilities could involve extensive site preparations such as excavation and backfill. Other facilities that would involve less extensive grading include a digester and an addition to the operations and maintenance building.

Construction would involve soil disruption, but this impact is not of special concern since most of the plant site is composed of fill material. Replacement of clear, soft soils on the lower flat end of the site with engineered fill would also be necessary. Construction excavation and spoil disposal may result in limited topographic or soil profile modifications which would be detrimental unless properly mitigated. The proposed changes are not expected to affect the stability of the banks to the east of the site. Erosion during construction is possible, but not judged to be important at Richmond Beach due to the relatively flat terrain at the treatment plant site.

### Air Quality and Odors

During construction of the secondary treatment facilities minor local increases in particulates and hydrocarbons could occur. Once the secondary treatment process is operating, it should have no noticeable impact on air quality parameters, aerosols or odors. Sludge truck trips would increase from 0.8 to 1.1 hauls per day, but this activity should produce no measurable long-term effect on air quality.

### Water Quality

Upgrading the Richmond Beach facility to secondary treatment would achieve a 75% decrease in solids and 81% decrease in BOD loads to Puget Sound over baseline (B) levels. Nutrients and flows would continue at baseline levels. With improvement in chlorination practices, fluctuating chlorine residuals would be eliminated, as would potentially toxic residual chlorine levels or high bacterial levels. Chlorine use planned in E. F, and G would be only about 12% (Metropolitan Engineers, 1977) less than for primary treatment (A and B), although secondary effluent requires only half the chlorine for the same level of bacterial removal due to increases in flow. Whether or not shoreline waters would meet state fecal coliform standards for shellfish waters cannot be determined as the sources of bacteria have not been identified.

Metals concentrations in the receiving waters could be reduced with the substantial metals removal associated with secondary treatment, resulting in a moderate benefit to Puget Sound.

Permissible BOD and solids levels would presumably be met even in wet weather with facility sizing and the high removal of these parameters with secondary treatment.

## Biology

Terrestrial biology. The construction of aeration tanks, digesters and chlorine contact channels under alternatives E, F, and G would eliminate approximately one-fourth of the alder-willow grove to the north of the plant and some of the trees to the east of the plant. This is judged to be a minor-to-moderate, limited, long-term adverse impact on the non-urban terrestrial biology of Richmond Beach.

Puget Sound biology. Alternatives E, F and G would include secondary treatment at Richmond Beach. Flows and nutrients would continue at baseline levels, except that peak flows would be reduced by one mgd due to infiltration/inflow reduction; BOD and solids loads would be reduced 81% and 75% below baseline. Metals, toxicants and pesticides in the effluent (which have largely not been monitored) would be similarly reduced.

Intertidal biota would continue to be exposed to effluent nutrients at baseline levels, but would no longer be exposed occasionally to high chlorine residuals, as chlorination practices are upgraded. Fecal coliforms and pathogens could decrease in intertidal shellfish if disinfection is optimized.

Shoreline areas may or may not meet state shellfish standards as the contributions and sources of bacteria have not been identified. Sources other than effluent suggested include septic tank seepage. Hidden Lake pump station overflows would be reduced, with minor benefits to those limited beach areas affected.

Effects of other parameters in effluent - BOD, solids, metals, pesticides and toxicants - would be greatly reduced due to secondary treatment. Effects of BOD and solids have not been documented, and levels of metals, pesticides and toxicants are not generally measured, however. Metals levels in intertidal plants and animals could decrease if the source is Richmond Beach effluent, rather than industrial discharges nearby.

Data on nearshore biota on Richmond Beach are sparse, so it is not known whether or not measureable effluent effects on free-swimming and bottom dwelling organisms occur. It is assumed that effects on benthic communities would be similar to those found at Carkeek, under Alternative B, but to a smaller degree as the Richmond Beach effluent flow is about one-third as large. The adverse effects are assumed to be very minor, and limited in extent on the bottom, but long-term and irreversible for metals and toxicants. With substantial removals in secondary treatment, the effects are assumed to be minor-to-negligible. Any effects of nutrients (yet undocumented) would continue at baseline levels.

## Natural Resources and Energy

Natural resources and energy impacts are not analyzed on a site-specific basis. Rather, these considerations are analyzed in the Regional EIS on an interrelated basis between the five existing Metro plants and potential new sites.

## The Human Environment

Many of the human environment facets pertinent to the Richmond Beach site are discussed and evaluated only in the Regional EIS. Topics described in this volume include: land use; legal and institutional; agency and neighborhood goals; social, recreational, and cultural; archeological and historical; health and safety; and aesthetics and nuisance.

## Alternatives and Impacts
## Alternatives E, F and G

*Land use*. Under Alternatives E, F and G, the Richmond Beach facility would be expanded to include secondary treatment; this expansion would occur on the ledge which already exists and which is currently not developed. The impact on land use would be adverse, minor, long-term, reversible, local, and definite. A permit from the King County Shorelines Management Master Program would be required because this expansion takes place within 200 feet of shore.

*Legal and institutional*. Many of the legal issues are developed in the Regional EIS. These alternatives would fulfill the requirements of PL 92-500 at Richmond Beach.

*Agency and neighborhood goals*. The expansion of the Richmond Beach facility does not conflict with the goals of residents of the Richmond Beach area, so long as it is expanded with a consideration for aesthetics and the neighborhood is not "downgraded."

With adequate landscaping, the implementation of these alternatives would not conflict with the goal of PSCOG that "natural amenities identified as important to the region's character and beauty shall be preserved or sensitively developed as a second choice."

*Employment and costs*. Employment and cost considerations are developed in the Regional EIS.

*Social, recreational, and cultural*. Society and culture would not be affected by the Richmond Beach facility. Recreational usage of the beach would continue to be impaired only to the extent that those who use this beach would have to walk around the facility. This impact is considered adverse, minor, long-term, reversible, local, and definite.

*Archeological and historical.* No registered historical sites would be affected by these alternatives. Construction under these alternatives would occur in a relatively undisturbed area; the Department of Archeology recommends that this area have an advance reconnaissance by a professional archeologist.

*Health and safety*. There would be fewer health risks associated with the consumption of shellfish because of secondary effluent discharge, as is discussed in the biological section of the EIS.

An unlikely safety hazard is accidental leakage of chemicals when they are in transport, or handled on site. Although nearly every U. S. water and wastewater treatment facility uses chemicals, there have been very few chemical-related accidents.

The health and safety problems related to sludge transport and disposal would be as improbable as for any other trucks in transit.

Construction safety risk would be as for any other similar construction: with safety conscious procedures there should be a limited chance of accidents.

Aesthetics and nuisance. Because the Richmond Beach facility would continue to be located below an embankment, would be surrounded by vegetation, and have a low profile, it would be only slightly visible from many angles; views toward Puget Sound from homes on the hills above the site would be unobstructed by the plant. Odor would continue to be slight; noise would be at ambient levels. Much of the secondary treatment expansion would occur in areas which would be partially blocked from view by the embankment.

The aesthetic nuisance of the facility would be in part neutralized by the presence of the Point Wells industrial complex just north of the facility.

Aesthetic impacts are considered adverse, minor, long-term, reversible, local and probable.

Under these alternatives, there would be 1.1 sludge trucks per day leaving the Richmond Beach facility. These would travel on roads which are extensively used by industrial traffic, and therefore would not be noticed. This impact is insignificant.

## Mitigation Measures

Several mitigation measures are suggested to aid in the reduction of adverse impacts resulting from the implementation of this alternative.

Pump station overflows occur at Pump Station No. 4 in the Ronald Sewer district and at the Richmond Beach pump station, with discharge ultimately to Puget Sound. With the installation of the standby generator at Hidden Lake pump station, overflows at Station No. 4 will be reduced. Standby power at the remaining pumpstations is not provided;

therefore, power failures would be expected to result in sewage overflows to the Sound. Due to the shallow depths of the overflow pipes into the Sound, contamination of the shoreline when overflow occurs is inevitable. Provision of a backup power system into these pumping stations would mitigate the occurrence of overflows and thus of contamination of adjacent shorelines.

The wastewater facilities are fairly well situated with respect to visual impact on the surrounding neighborhood. The remaining visual nuisance of the wastewater treatment facilities could be mitigated by implementing the landscaping options which would hide the facilities. Implementation of the necessary I/I work in the Highland sewer district would reduce the peak flows and save chemicals, energy and money.

## Unavoidable Adverse Impacts

Under this alternative, the following adverse impacts would be unavoidable without unreasonable outlays of money.

Facilities construction. Although construction activities can be screened from public view, they will still be a temporary nuisance.

Sludge trucking. Under current practices of disposing sludge at remote sanitary landfill sites, there will necessarily be sludge trucking.

Land use. Land is required in all alternatives; the question is: where will the impact occur?

Aesthetic nuisance of plant location. Wastewater treatment facilities are a nuisance in all alternatives; the question is: how can these nuisances be made smallest?

O&M and capital costs. Construction of wastewater facilities, interceptors, and CSO holding tanks is expensive. The facilities must be operated and maintained.

Energy expenditures. Energy can in part be provided by the methane produced in anaerobic digestion, but there is still a large expenditure of energy which cannot be mitigated.

## ALTERNATIVE H

### General Description

The Regional Alternative H (Deconsolidation/Reclamation) would affect the Richmond Beach plant site by providing secondary treatment to 2.5 mgd average and 8 mgd peak flows, exactly as under Alternatives E, F, and G. The difference in Alternative H is that the Kenmore outfall would be constructed through the Richmond Beach service area for discharge to Puget Sound off Richmond Beach.

The approximate route of the tunnel connection for the proposed Kenmore plant to the new outfall (which would parallel the present Richmond Beach outfall) is shown in Figure 3-6. The tunnel would be at least eight feet in diameter. The Draft Facility Plan indicates it would be completed in 1983 at a cost of $37,200,000. By 2005, the secondary treatment plant at Kenmore would produce 21 mgd average, 55 mgd peak flows for discharge off Richmond Beach. If this alternative is chosen, a separate environmental analysis of the Kenmore plant, interceptor and outfall would be made prior to construction.

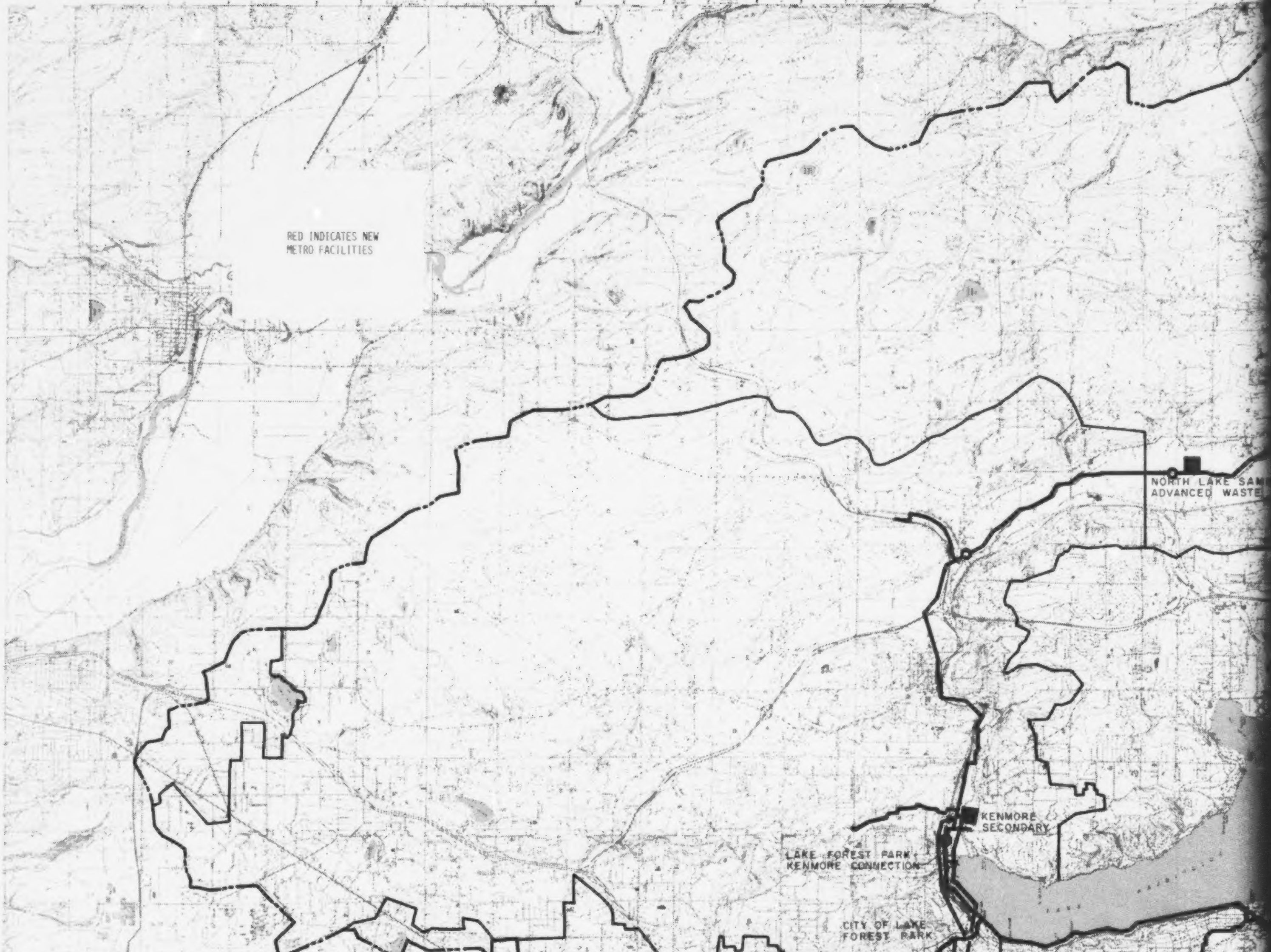
### Impacts

This analysis includes primary impacts only. Secondary impacts are considered in the Regional EIS.

#### Geology, Soils and Topography

Under Alternative H, secondary treatment facilities would be built at Richmond Beach. A new outfall would be constructed for two miles approximately east-west across the Richmond Beach service area to extend into Puget Sound parallel to and beyond the existing outfall. This line would carry up to 55 mgd of secondary effluent from the new Kenmore secondary facility.

The area needed for treatment facilities at Richmond Beach would increase from 2.4 to 4.2 acres, which is currently available at the site with no need for shoreline fill. Constructing aeration tanks, secondary clarifiers, a waste activated sludge thickener, a chlorine contact tank and dechlorination facilities could involve extensive site preparations such as excavation and backfill. Other facilities on site that would involve



RED INDICATES NEW METRO FACILITIES

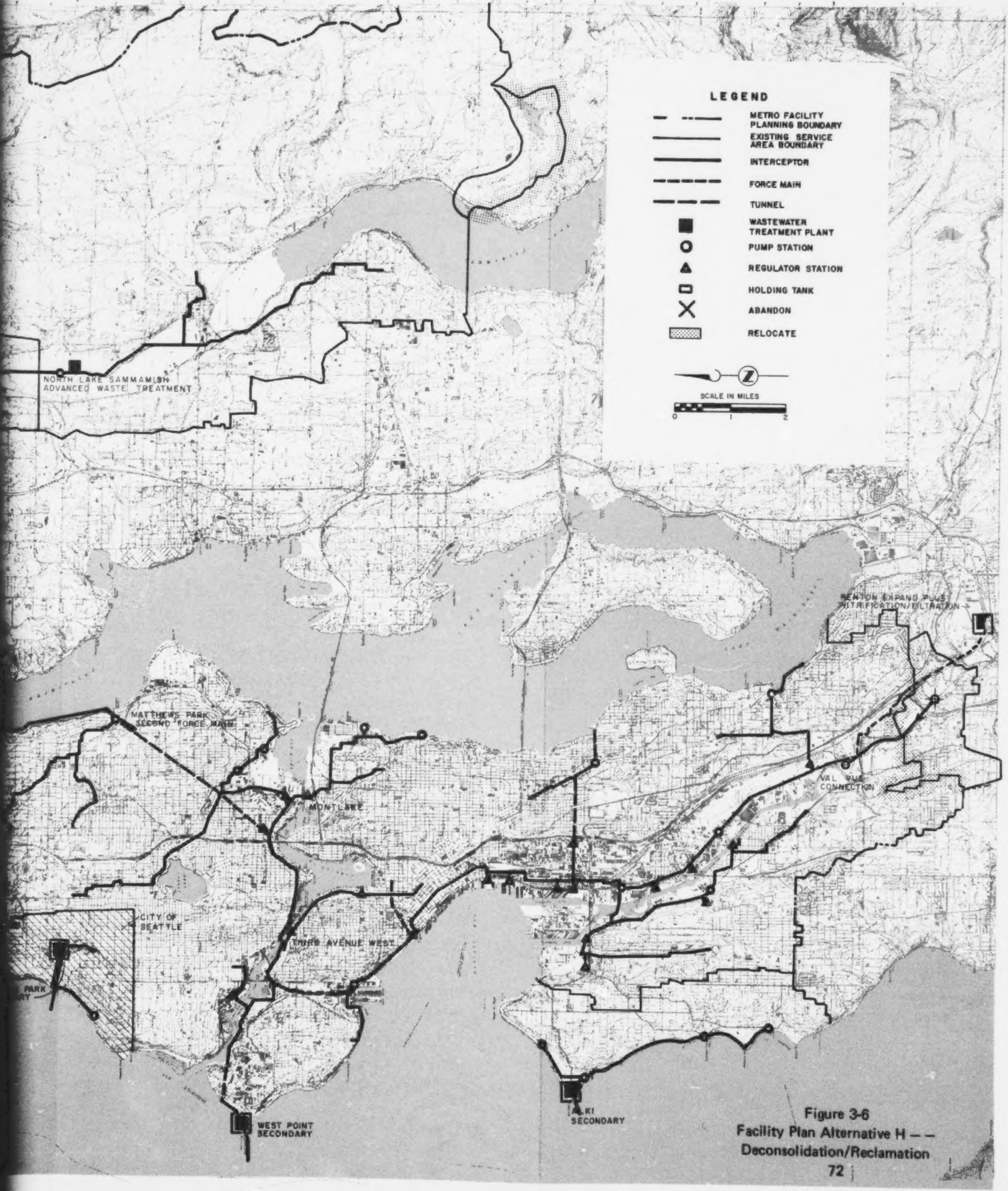

LEGEND
METRO FACILITY PLANNING BOUNDARY
EXISTING SERVICE AREA BOUNDARY
INTERCEPTOR
FORCE MAIN
TUNNEL
WASTEWATER TREATMENT PLANT
PUMP STATION
REGULATOR STATION
HOLDING TANK
ABANDON
RELOCATE
SCALE IN MILES
0
1
2
NORTH LAKE SAMMAMISH ADVANCED WASTE TREATMENT
RENTON EXPAND PLUS NITRIFICATION/FILTRATION
MATTHEWS PARK SECOND FORCE MAIN
MONTLAKE
VAL VUE CONNECTION
CITY OF SEATTLE
THIRD AVENUE WEST
PARK
ARY
WEST POINT SECONDARY
ALKI SECONDARY

Figure 3-6
Facility Plan Alternative H — —
Deconsolidation/Reclamation

less extensive grading include a digester and an addition to the operations and maintenance building.

Construction at Richmond Beach would involve soil disruption, but this impact is not of special concern since most of the plant site is composed of fill material. Replacement of clear, soft soils on the lower flat end of the site with engineered fill would also be necessary. Construction excavation and spoil disposal may result in limited topographic or soil profile modifications which could be detrimental unless properly mitigated. The proposed changes are not expected to affect the stability of the banks to the east of the site. Erosion during construction is possible, but not judged to be important at Richmond Beach due to the relatively flat terrain at the treatment plant site. Possible impacts of a sub-option for decentralized sludge management are undetermined, since process details are not yet refined.

The exact route of the Kenmore outfall line has not been defined, but would involve tunneling, which would disturb some shoreline and perhaps intertidal areas, as well as offshore sediments. The disruption could cause changes in soil and sediment profile, erosion, deposition, and turbidity. The adverse impacts on the service area are judged to be moderate, somewhat limited in extent, and temporary. Effects of erosion and deposition may be irreversible.

## Air Quality and Odors

During construction of the secondary treatment facilities minor local increases in particulates and engine emissions could occur. Once the secondary treatment process is operating it should have no noticeable impact on air quality parameters, aerosols or odors. Sludge truck trips would increase from 0.8 to 1.1 hauls per day, but this activity should produce no measurable long-term effect on air quality.

During construction of the Kenmore outfall, minor local increases in particulates (dust) and engine emissions could occur. The impact is judged to be insignificant.

## Water Quality

The Richmond Beach facility would be upgraded to secondary treatment, but with the Kenmore outfall total flows to the Sound at this point would increase by 9.4 times. Overall solids loads would increase 2.3 times and BOD loads by 1.8

times over baseline leves (Alternative B). Nutrient loads at this point would probably also increase many foled. With improvement in chlorination practices at Richmond Beach, fluctuating chlorine residuals and thus potentially toxic residual chlorine levels or high bacterial levels would be eliminated. Chlorine use planned in E, F, and G would be only about 12% less than for primary treatment (A and B), although secondary effluent requires only half the chlorine for the same level of bacterial removal, as flows would increase. Chlorination practices at Kenmore are expected to be similar.

Whether or not shoreline waters would meet state fecal coliform standards for shellfish waters cannot be determined as the sources of bacteria have not been identified.

Metal concentrations in receiving waters could be increased with the probably substantial increase in metal loads associated with the addition of Kenmore effluent.

Permissible BOD and solids levels would presumably be met even in wet weather at Richmond Beach with facility sizing and the high removal of these parameters with secondary treatment. Permissible levels for Kenmore effluent have not been determined.

BOD and solids loads to the Sound at this point would be almost six times larger than at Carkeek under Alternative H, and one-sixth as large as at West Point. The negative impacts on water quality are expected to be minor-to-moderate in a limited area near the plume, long-term as flows would continue and, for metals and toxicants, irreversible.

## Biology

Terrestrial biology. The construction of aeration tanks, digesters and chlorine contact channels under Alternative H would eliminate approximately one-fourth of the alder-willow grove to the north of the plant and some of the trees to the east of the plant. This is judged to be a minor-to-moderate, limited, long-term adverse impact on the non-urban terrestrial biology of Richmond Beach.

Puget Sound biology. Alternative H would include secondary treatment at Richmond Beach and the construction and operation of a new outfall from Kenmore. Flows and nutrients would increase more than nine-fold to Puget Sound at this point. BOD and solids loads would increase 1.8 times and 2.3

times respectively over baseline. Metals, toxicants and pesticides, which have not been generally monitored would probably be similarly increased.

With a change in disinfection practices, intertidal biota would no longer be occasionally exposed to high chlorine residuals. Fecal coliforms and pathogens could decrease in intertidal shellfish if effluent disinfection is optimized. Shoreline areas may or may not meet state shellfish standards as the contributions and sources of bacteria have not been identified. Sources other than effluent suggested include septic tank seepage. Pump station overflows would be eliminated, with minor benefits to those beaches affected.

Effects of other parameters in effluent - BOD, solids, metals, pesticides and toxicants - would be greatly increased due to larger flows of secondary effluent. Effects of BOD and solids have not been documented, and levels of metals, pesticides and toxicants are not generally measured, however. Metals levels in intertidal plants and animals could increase if the source is Richmond Beach and Kenmore effluents, rather than industrial discharges nearby.

Data on nearshore biota on Richmond Beach are sparse, so it is not known whether or not measurable effluent effects on free-swimming and bottom dwelling organisms occur. It is assumed that effects on benthic communities would be similar to those found at Carkeek, under B, but to a greater degree as the Richmond Beach and Kenmore effluent flow would be almost six times as large. The adverse effects are assumed to be minor-to-moderate and limited in extent on the bottom, but long-term and irreversible for metals and toxicants. Any effects of nutrients (yet undocumented) would increase many fold, but are not determinable.

## Natural Resources and Energy

Natural resources and energy impacts are not analyzed on a site-specific basis. Rather, these considerations are analyzed in the Regional EIS on an interrelated basis between the five existing Metro plants and potential new sites.

## The Human Environment

Many of the human environment facets pertinent to the Richmond Beach site are discussed and evaluated only in the

Regional EIS. Topics described in this volume include: land use; legal and institutional; agency and neighborhood goals; social, recreational, and cultural; archeological and historical; health and safety; and aesthetics and nuisance.

Land use. Under Alternative H the Richmond Beach facility would be expanded to include secondary treatment; this expansion would occur on the ledge which already exists, and which is currently not developed. The impact on land use would be adverse, minor, long-term, reversible, local, and definite. A permit from the King County Shoreline Master Program would be required, because this expansion takes place within 200 feet of shore.

This alternative would also include the construction of the Kenmore tunnel, which would connect the proposed Kenmore facility with an outfall into Puget Sound at Richmond Beach. Although an exact route has not been chosen, this tunnel may pass under the communities of North City, Richmond Highlands, Echo Lake, and Innis Arden. This tunnel would be as much as 100 feet underground, would be a minimum of 8 feet in diameter, and would be dug by a boring machine. The only surface area required in this operation would be an occasional entrance to the tunnel, which would only be necessary during construction. This impact on land use would be adverse, minor, short-term, reversible, local, and probable.

Legal and institutional. Many of the legal issues are developed in the Regional EIS. This alternative would fulfill the requirements of PL 92-500. A new NPDES permit and shorelines permit would be required for the Kenmore outfall.

Agency and neighborhood goals. The expansion of the Richmond Beach facility does not conflict with the goals of residents of the Richmond Beach area, so long as it is expanded with a consideration for aesthetics and the neighborhood is not "downgraded."

With adequate landscaping, the implementation of this alternative would not conflict with the goal of PSCOG that "natural amenities identified as important to the region's character and beauty shall be preserved or sensitively developed as a second choice."

The Kenmore tunnel would have no effect on agency or neighborhood goals.

Employment and costs. Employment and cost considerations are developed in the Regional EIS.

Social, recreational, and cultural. Society and culture would not be affected by the Richmond Beach facility. Recreational usage of the beach would continue to be impaired only to the extent that those who use this beach would have to walk around the facility. This impact is considered adverse, minor, long-term, reversible, local, and definite.

The Kenmore tunnel would cause negligible social, recreational, or cultural impact.

Archaeological and historical. No registered historical sites would be affected by this alternative. Construction under this alternative would occur in a relatively undisturbed area; the Department of Archeology recommends that it have an advance reconnaissance by a professional archeologist.

The archeological impacts of the Kenmore tunnel are unknown at this time, but would be analyzed if this alternative is chosen.

Health and safety. The extent of health risks associated with the consumption of shellfish under this alternative is undetermined. Secondary treatment would cause a reduction in the concentration of pathogens entering Puget Sound, but the wastewater load would increase greatly with the discharge from the Kenmore outfall.

An unlikely safety hazard is accidental leakage of chemicals when they are in transport, or handled on-site. Although nearly every U. S. water and wastewater treatment facility uses chemicals, there have been very few chemical-related accidents.

The health and safety problems related to sludge transport and disposal would be as improbable as for any other trucks in transit.

Construction safety risk at Richmond Beach would be as for any other similar construction: with safety conscious procedures there should be a limited chance of accidents.

Since the Kenmore outfall is constructed underground, special safety precautions would be required. With these precautions, tunneling may even be safer than construction above ground (Gordon Gabrielson personal communication, 1977).

Aesthetics and nuisance. Because the Richmond Beach facility would continue to be located below an embankment, would be surrounded by vegetation, and have a low profile, it would be only slightly visible from many angles; views toward Puget Sound from homes on the hills above the site would be unobstructed by the plant. Odor would continue to be slight; noise would be at ambient levels. Much of the secondary treatment expansion would occur in areas which would be partially blocked from view by the embankment.

The aesthetic nuisance of the facility would be in part neutralized by the presence of the Point Wells industrial comples just north of the facility.

Aesthetic impacts are considered adverse, minor, long-term, reversible, local, and probable.

Under this alternative, there would be 1.1 sludge trucks per day leaving the Richmond Beach facility. These would travel on roads which are extensively used by industrial traffic and therefore would not be noticed. This impact is insignificant.

The Kenmore tunnel would cause negligible nuisance: during construction, the boring machine would be far underground; therefore, its presence would be unheard by those above. Since this tunnel would pass through glacial till, which is easily displaced by the boring machine, no blasting is anticipated.

## Mitigation Measures

Several mitigation measures are suggested to aid in the reduction of adverse impacts resulting from the implementation of this alternative.

Pump station overflows occur at pump station No. 4 in the Ronald sewer district at the Richmond Beach pump station, with discharge ultimately to Puget Sound. With the installation of the standby generator at Hidden Lake pump station, overflows at Station No. 4 will be reduced. Standby power at the remaining pump stations is not provided; therefore, power failures would be expected to result in sewage overflows to the Sound. Due to the shallow depths of the overflow pipes into the Sound, contamination of the shoreline when overflow occurs is inevitable. Provision of a backup power system into these pumping stations would mitigate the occurrence of overflows and thus of contamination of adjacent shorelines.

## Alternatives and Impacts
### Alternative H

There is little detailed, quantitative information available on the water quality, biology, currents and sediments off Richmond Beach. Of these, water quality and currents are best described in available literature. It is suggested that a comprehensive study be conducted off Richmond Beach to accurately determine existing marine environmental conditions before constructing the new Kenmore outfall there.

The wastewater facilities are fairly well situated with respect to visual impact on the surrounding neighborhood. The remaining visual nuisance of the wastewater treatment facilities could be mitigated by implementing the landscaping options which would hide the facilities.

The construction of the Kenmore outfall carries a moderate potential for environmental disruption, as it would extend across suburban neighborhoods and through shoreline and intertidal areas south of the existing plant. Careful consideration of the route and scheduling of construction could minimize these effects.

## Unavoidable Adverse Impacts

Under this alternative, the following adverse impacts would be unavoidable.

Facilities construction. Although construction activities can be screened from public view, they will still be a temporary nuisance.

Sludge trucking. Under current practices of disposing sludge at remote sanitary landfill sites, there will necessarily be sludge trucking.

Land use. Land is required in all alternatives; the question is: where will the impact occur?

Aesthetic nuisance of plant location. Wastewater treatment facilities are a nuisance in all alternatives; the question is: how can these nuisances be made smallest?

O&M and capital costs. Construction of wastewater facilities and interceptors is expensive. The facilities must be operated and maintained.

Energy expenditures. Energy can in part be provided by the methane produced in anaerobic digestion, but there is still a large expenditure of energy which cannot be mitigated.

Interceptor and outfall construction. Disruption will occur wherever lines are laid.

## SUMMARY OF IMPACTS

This analysis includes primary impacts only. Secondary impacts are considered in the Regional EIS.

### Geology, Soils and Topography

Alternative H, which requires the most construction in installing secondary treatment facilities at Richmond Beach and the construction of the Kenmore outfall under two miles of the Richmond Beach service area would cause extensive impacts to soils and geology. The effects are expected to be moderate, somewhat limited in extent, and generally temporary for the pipe, and long-term at the facility stie. Alternatives E, F, and G also include secondary treatment at Richmond Beach, but no new outfall. No shoreline fill would be required in any of E, F, G, or H. Site impacts would be moderate, limited but of long duration and irreversible for toptgraphic and soil profile modifications if not properly mitigated

Alternatives C and D would mean to alternation to soil, topography and geology as facilities would be built on already-prepared land. Alternatives A and B are expected to have no impacts on geology and soils as no construction would be involved.

### Air Quality and Odors

Air quality impacts would be primarily the result of construction activities which create dust and increased engine emissions. The impacts are expected to be minor and temporary. Once operating, the facilities are expected to have no noticeable negative impact on air quality, aerosols or odors as the site is effectively isolated from nearby residences and the plant is operated in a responsible manner.

Impacts of E, F, and G from construction of secondary facilities at Richmond Beach (with no outfall) would similarly be minor, limited in extent, highly temporary and reversible, but smaller overall than from H as no outfall impact would occur. As above, air quality impacts from plant operations are expected to be negligible.

Impacts of construction of chemical storage and handling facilities for and operations of enhanced primary treatment under C and D are expected to be negligible. Baseline air quality impacts are also considered to be insignificant. The impact on air quality in terms of particulates and engine emissions from sludge trucks under any of the alternatives is expected to negligible.

## Water Quality

Alternative H would have considerable negative impacts on Puget Sound water quality near Richmond Beach as total flows and loads including metals and toxicants would increase significantly even though the effluent would have received secondary treatment and dechlorination. It is assumed that, due to tidal current patterns, the effluent would continue to come up on the beach. Offshore, the effluent plume would be larger, causing localized effects on water quality. As the flow would be about one-sixth of that from West Point, the potential effects are judged to be minor-to-moderate on a limited area near the plume, long-term as flows would continue, and for metals and toxicants, irreversible.

By contrast, Alternatives E, F, nd G, the other secondary alternatives, would provide the greatest benefit to Puget Sound water quality through 81% and 75% BOD and solids removals from baseline level flows. Improved chlorination practices would eliminate fluctuating residuals, such that fecal coliform levels at braches could be reduced. As several sources of bacteria may be involved, whether or not state standards for shellfish waters would continue to be exceeded cannot be determined. Metals loads would probably be significantly reduced due to secondary treatment. Hidden Lake pump station overflows to Puget Sound would be reduced.

Enhanced primary treatment of continued baseline level flows would reduce annual solids and BOD loads by 21 to 22% below baseline levels, an amount considered to be minor-to-moderate. Addition of alum in summer only could allow BOD and solids loads in wet weather to exceed permissible levels. Continuation of present chlorination practices could result in toxic residuals or high bacterial counts in receiving waters. Pump station overflows would continue to have effects on beaches.

## Biology

The greatest negative impacts overall would occur from Alternative H.

## Terrestrial Biology

Alternative H includes the most construction, but much of it is tunneling. Secondary facilities would require one-fourth the alder-willow grove north and east of the plant; a minor-to-moderate impact. The construction of the Kenmore outfall under the Richmond Beach service area would have negligible impacts.

Alternatives E, F, and G which include the same secondary facilities but no outfall would also have a minor-to-moderate impact. Alternatives C and D in which new facilities would be on already prepared land, and A and B which include no construction, are judged to have no impacts on terrestrial habitats.

## Puget Sound Biology

Alternative H would have substantial impacts on Puget Sound biota, as organisms near Richmond Beach could be exposed to more than nine times the nutrients, and two or three times the BOD, solids and, possibly, metals and toxicity of baseline conditions. Effluent is assumed to continue to come up on the beach due to tidal currents, exposing intertidal life to the above parameters. Shellfish could continue to pose a potential health risk in this and all other alternatives, as the source of bacteria exceeding state standards for shellfish waters has not been identified.

Alternatives E, F, and G would maintain effects of nutrients at baseline levels, but BOD and solids loads (and probably metals and toxicants) would be significantly reduced (75 - 81%). Effects on intertidal organisms, and nearshore benthic and free-swimming life could be similarly reduced. Organisms would probably no longer be exposed to fluctuating chlorine residuals.

The same effects would be reduced to a far lesser extent by C and D with only 21-22% reduction in effluent loads over baseline (B) levels, and continuation of present chlorination practices.

Data on the marine environment at Richmond Beach either intertidally or subtidally are sparse. Toxic effects and changes in benthic communities have not been documented. No survey has been made of fishes near the outfall. The source of fecal coliforms in waters on the beaches have not been identified. In addition, the Richmond Beach flow is small in all alternatives but H, and all effects are probably not major.

## Natural Resources and Energy

Natural resources and energy impacts are not analyzed on a site-specific bases. Rather, these considerations are analyzed in the Regional EIS on an interrelated basis between the five existing Metro plants and potential new sites.

## The Human Environment

Many of the human environment facets pertinent to the Richmond Beach site are discussed and evaluated only in the Regional EIS. These include such topics as employment and costs, and many of the legal considerations. This necessity to treat certain topics on a regional basis stems from the interrelatedness of the plants and the trade-offs between alternatives.

Topics described in this volume include: land use; legal and institutional; agency and neighborhood goals; social, recreational, and cultural; archaeological and historical; health and safety; and aesthetics and nuisance.

### Land Use

Under Alternatives A and B, the Richmond Beach facility would not be changed. The impact would continue to be adverse, minor, long-term, reversible, local and definite.

Under Alternatives C and D, the Richmond Beach facility would add enhanced primary treatment. All of this addition would occur within the present built-up area, so there is expected to be little new impact on land use; the impact would still be adverse, minor, long-term, reversible, local, and definite.

Under Alternatives E, F, G, and H, the Richmond Beach facility would be expanded to include secondary treatment; this expansion would occur on the ledge which already exists, and which is currently not developed. The impact on land use would be adverse, minor, long-term, reversible, local and definite.

For the additions and expansions in Alternatives C, D, E, F, G, and H a permit from the King County Shorelines Management Master Program would be required, because these additions take place within 200 feet of shore.

Alternative H would also include the construction of the Kenmore tunnel, which would connect the proposed Kenmore facility with an outfall into Puget Sound at Richmond Beach. Although an exact route has not been chosen, this tunnel may pass under the communities of North City, Richmond Highlands, Echo Lake, and Innis Arden. This tunnel would be as much as 100 feet underground, would be a minimum of 8 feet in diameter, and would be dug by a boring machine which would not be heard from the surface. The only surface area required in this operation would be an occasional entrance to the tunnel, which would be necessary only during construction. This impact on land use would be adverse, minor, short-term, reversible, local, and probable.

## Legal and Institutional

Many of the legal issues are developed in the Regional EIS. Alternatives E, F, G, and H would fulfill the requirements of PL 92-500; Alternatives A, B, C, and D would not. The Kenmore outfall would require a shoreline and NPDES permit.

## Agency and Neighborhood Goals

The presence of the Richmond Beach facility does not conflict with the goals of residents of the Richmond Beach area.

The expansion of the Richmond Beach facility, which would occur under Alternatives E, F, G, and H would not conflict with the goals of residents of the Richmond Beach area, so long as it is expanded with a consideration for aesthetics and the neighborhood is not "downgraded " (Clean Water Watch, 1976).

With adequate landscaping at the Richmond Beach facility, the implementation of these alternatives would not conflict with the goal of PSCOG that "natural amenities identified as important to the region's character and beauty shall be preserved or sensitively developed as a second choice."

Alternatives E, F, G, and H, by implementing secondary treatment, meet the goal of PSCOG that "achievement or maintenance of water quality standards as established by law is recognized and supported."

The Kenmore tunnel implemented in Alternative H would have no effect on agency or neighborhood goals.

## Employment and Costs

Employment and cost considerations are developed in the Regional EIS.

## Social, Recreational, and Cultural

Under all the alternatives, society and culture would not be affected by the Richmond Beach facility. Recreational usage of the beach would continue to be impaired to the extent that those who use the beach would have to walk around the facility. In addition, people may have qualms about swimming at a beach adjacent to a sewage treatment plant. These impacts are considered adverse, minor, long-term, reversible, local, and definite.

The Kenmore tunnel implemented in Alternative H would cause negligible social, recreational, or cultural impacts.

## Archeological and Historical

No known archeological or registered historical sites would be affected by the implementation of Alternatives A, B, C, and D.

Under Alternatives E, F, G, and H, expansion at the Richmond Beach facility would occur in a relatively undisturbed area; the Department of Archeology recommends that this area undergo advance reconnaissance by a professional archeologist before construction.

Along the Kenmore outfall, there are no registered historical sites which would be affected; data on archeological sites are not available.

## Health and Safety

Under Alternatives E, F, G, and H, which implement secondary effluent discharge, there may be fewer health risks associated with the consumption of shellfish, as discussed in the biological section of the EIS. Under Alternatives A, B, C, and D, which implement primary effluent discharge, these health risks may continue.

An unlikely safety hazard is accidental leakage of chemicals when they are in transport or handled on site. Although nearly every U. S. water and wastewater treatment facility uses chemicals, there have been very few chemical-related accidents.

The health and safety problems related to sludge transport and disposal would be as improbable as for any other trucks in transit.

Construction safety risk under Alternatives C, D, E, F, G, and H at Richmond Beach would be as for any other similar construction; with safety conscious procedures there should be a limited chance of accidents.

Alternatives A and B do not include construction at Richmond Beach.

Since the Kenmore tunnel, implemented in Alternative H, is constructed underground, special safety precautions would be required. With these precautions, tunneling may even be safer than above-ground construction. (Gordon Gabrielson, Personal Communication, 1977).

## Aesthetics and Nuisance

Because the Richmond Beach facility under all alternatives would continue to be located below an embankment, would be surrounded by vegetation, and have a low profile, it would be only slightly visible from many angles. Views from homes on the hills above the site would be unobstructed by the site. Odor would continue to be slight; noise would be at ambient levels.

Under Alternatives E, F, G, and H, much of the secondary treatment expansion would occur in areas which would be partially blocked from view by the embankment.

The aesthetic nuisance of the facility would be in part unnoticed because of the greater nuisance of the Point-Wells industrial complex just north of the facility.

Aesthetic impacts are considered to be adverse, minor, long-term, reversible, local and probable. These would be slightly greater under Alternatives E, F, G, and H, because of the expansion for secondary treatment.

Sludge truck traffic is indicated in Table 3-2. These sludge trucks would travel on roads which are extensively used by industrial traffic; and therefore they would not be noticed. This impact is insignificant.

The Kenmore tunnel would cause negligible nuisance during construction. The boring machine would be far underground, therefore, its presence would be unknown by those above. Since this tunnel would pass through glacial till, which is easily displaced by the boring machine, no blasting is anticipated.

TABLE 3-2

SLUDGE TRUCK TRAFFIC AT RICHMOND BEACH
(In units of trucks/day)

| Richmond Beach | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| Trucks/Day | 0.8 | 0.8 | 1.3 | 1.3 | 1.1 | 1.1 | 1.1 | 1.1 |

# CHAPTER IV

# CITIZEN AND AGENCY INVOLVEMENT

Involvement of citizens and agencies (or their consultants) regarding the Facility Plan and EIS for Richmond Beach has consisted of informal group sessions, information meetings and community meetings.

During the spring of 1976, Metro's socio-economic consultant, Human Resources Planning Institute (HRPI), contacted interested citizens and groups in the Richmond Beach area to determine local wastewater treatment concerns and issues. Following initial HRPI contacts, a total of eight citizens attended two informal group sessions (March 12 and 15, 1976) and eight persons met with HRPI for an information meeting.

The first community meeting for the Richmond Beach area was held June 1, 1976 at the Richmond Beach Congregational Church. It was attended by twenty-four citizens plus representatives from Metro Council, Metro staff, the Citizens' Water Quality Advisory Committee (CWQAC), and consultants. The panel discussed the activities of CWQAC, PL 92-500, Metro's effort to amend the law, Metro's overall planning effort, the Richmond Beach alternatives, combined sewer overflows, the Richmond Beach socio-economic survey, and potential architectural design elements.

The general comments at the meeting indicated there was no real opposition to expansion of the Richmond Beach wastewater treatment plant, but there was a major concern that the environment be protected. The main regional issues concerned the possibility of amending PL 92-500, the question of the necessity for secondary treatment, comments on Metro's strategy and Interim Studies, and protection of Puget Sound and marine life. Site-specific issues at Richmond Beach showed no anti-expansion sentiment, but a concern that any new design should consider view, avoid odor, protect the environment, be compatible with zoning, and not increase traffic. A questionnaire showed two-thirds of those present favored secondary treatment, while the remaining people opposed it because they believed it to be unnecessary. The meeting was summarized by Metro staff, mailed to those attending and kept on file in Metro offices.

The second community meeting for Richmond Beach was a joint meeting for the Richmond Beach and Carkeek Park treatment plants, held on November 15, 1976, at the Shoreline Community College. Attending were thirty-six citizens plus representatives from Metro Council, Metro staff, CWQAC, and consultants. The panel presented main planning alternatives ("no action," "legal" and "goal") and issues, architectural alternatives, and results of a social impact survey.

Since most of the citizens were from Carkeek Park and not Richmond Beach, the following discussion focused on Carkeek Park alternatives and regional issues. The system planning or regional issues addressed service areas, cost equity, sludge treatment sites, relationship between West Point and Carkeek Park expansion, abandonment of Alki versus Carkeek Park, advisability of considering illegal alternatives, decentralization, combined sewer overflows, long-term effects on Puget Sound water quality, and Metro's rates. No site-specific impacts for Richmond Beach were recorded.

On June 8, 1977, Metro scheduled a workshop to present preliminary information on the eight regional alternatives and their impacts and to solicit citizen input into the Draft EIS. However, no Richmond Beach area residents attended. A public hearing for the Draft EIS on Richmond Beach is planned for November 2, 1977. The public hearing for the Metro service area Final EIS's will be held March, 1978.

The site-specific issues raised in community meetings and through citizen/agency contacts to date regarding Richmond Beach have been included in this Draft EIS (Volume II). Regional or system-wide issues have been included in the Regional Analysis (Volume I). Both will be refined or expanded to cover comments on the Draft and Final EIS as well as at the future community meetings.

# APPENDIX A

## ELEMENTS OF THE ENVIRONMENT

WAC 197-10-442 SPECIAL CONSIDERATIONS REGARDING CONTENTS OF AN EIS ON A NON-PROJECT ACTION. (1) The requirements of WAC 197-10-440 apply to the contents of a draft EIS on a proposal for a non-project action. Lead agencies, however, have greater flexibility in their approach to achieving compliance with the requirements of WAC 197-10-440 in writing an EIS for non-project actions, because normally less specific details are known about the proposal and any implementing projects, as well as the anticipated impacts on the environment.

(2) The lead agency should be alert to the fact that it is in the development and review of proposals for non-project actions where the range of alternatives is typically more broad than that of a proposal for a project action (which is often narrowed to a specific location and design). The proposal should be described in a manner which encourages consideration of a number of alternative methods of accomplishing its objective. For example, an objective of an agency's proposal should be stated as "the facilitation of the movement of people from point A to point B" rather than "the widening of an urban arterial in order to accommodate additional privately-owned passenger vehicles."

WAC 197-10-444 LIST OF ELEMENTS OF THE ENVIRONMENT. (1) Every EIS shall have appended to it a list of the elements of the environment in subsection (2), (3) and (4) of this section. The lead agency shall place "N/A" ("not applicable") next to an item when the proposal, including its indirect impacts, will not significantly affect the area (or subarea) of the environment in question. Items marked "N/A" need not be mentioned in the body of the EIS. Subsections (2) and (3) of this section correspond in subject matter to the questions contained in the environmental checklist used for threshold determination, and the questions in the checklist may be used to interpret this outline listing.

(2) ELEMENTS OF THE PHYSICAL ENVIRONMENT.

(a) Earth.
(i) Geology.
(ii) Soils.
(iii) Topography.
(iv) Unique physical features.
(v) Erosion.
N/A (vi) Accretion/avulsion.

(b) Air.
(i) Air quality.
(ii) Odor.
(iii) Climate.

(c) Water.
N/A (i) Surface water movement.
N/A (ii) Runoff/absorption.

N/A (iii) Floods.
N/A (iv) Surface water quantity.
(v) Surface water quality. (ocean)
N/A (vi) Ground water movement.
N/A (vii) Ground water quantity.
N/A (viii) Ground water quality.
(ix) Public water supplies.

(d) Flora.
(i) Numbers or diversity of species.
(ii) Unique species.
(iii) Barriers and/or corridors.
(iv) Agricultural crops.

(e) Fauna.
(i) Numbers or diversity of species.
(ii) Unique species.
(iii) Barriers and/or corridors.
(iv) Fish or wildlife habitat.

(f) Noise.

N/A (g) Light and glare.

(h) Land use.

(i) Natural resources.
(i) Rate of use.
(ii) Nonrenewable resources.

(j) Risk of explosion or hazardous emissions.

(3) ELEMENTS OF THE HUMAN ENVIRONMENT.

(a) Population.

N/A (b) Housing.

(c) Transportation/circulation.
N/A (i) Vehicular transportation generated.
N/A (ii) Parking facilities.
N/A (iii) Transportation systems.
N/A (iv) Movement/circulation of people or goods.
N/A (v) Waterborne, rail and air traffic.
(vi) Traffic hazards.

(d) Public services.
N/A (i) Fire.
N/A (ii) Police.
N/A (iii) Schools.
(iv) Parks or other recreational facilities.
N/A (v) Maintenance.
N/A (vi) Other governmental services.

(e) Energy.
(i) Amount required.
(ii) Source/availability.

(f) Utilities.
(i) Energy.
N/A (ii) Communications.
N/A (iii) Water.
(iv) Sewer.
(v) Storm water.
(vi) Solid waste.

(g) Human health (Not including mental health)

(h) Aesthetics.

(i) Recreation.

(j) Archeological/historical.

(4) The following additional element shall be covered in all EISs, either by being discussed or marked "N/A," but shall not be considered part of the environment for other purposes:

N/A (a) Additional population characteristics.

(i) Distribution by age, sex and ethnic characteristics of the residents in the geographical area affected by the environmental impacts of the proposal.

WAC 197-10-446 DRAFT EIS--OPTIONAL ADDITIONAL ELEMENTS--LIMITATION. Agencies in their guidelines may add to the list in WAC 197-10-444 additional elements covering social, cultural and/or economic issues. Such additional elements shall become part of the environment for EIS purposes, and not otherwise. The guidelines of the lead agency shall control the content of the EIS, even though other agencies with jurisdiction are involved in the proposal. No agency shall prescribe additional material for an EIS beyond that which is required or optionally allowed by WAC 197-10-440 and -444, or which is added to the elements of the environment by the guidelines of the lead agency pursuant to the authority in this section [see WAC 197-10-440(14)].

## PUBLIC AWARENESS, HEARINGS AND CIRCULATION OF DRAFT EIS

WAC 197-10-450 PUBLIC AWARENESS OF AVAILABILITY OF DRAFT EIS. (1) Upon publication of the draft EIS, the responsible official shall list the proposal in the lead agency's "EIS Available Register" maintained at the agency's SEPA public information center.

(2) The lead agency is encouraged, but not required, to use any reasonable method calculated to inform the public of the availability of the draft EIS and of the procedures for requesting a public hearing. Examples of such methods are publication of notice in a newspaper of general circulation in the county, city or general geographic area where the proposal is located; notifying private groups that are known to be interested in a certain proposal; contacting news media personnel and encouraging news coverage; and, placing notices in appropriate regional, neighborhood or ethnic periodicals.

# APPENDIX B

# REFERENCES

See Regional Analysis EIS, Volume I, Appendix A for references.